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THE SWEDISH–NORWEGIAN EXPEDITION TO NORTH-EAST GREENLAND

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IT is a great honour and pleasure to me to have been asked to give you a brief account of the Swedish–Norwegian Expedition to Greenland in 1939–40, which, by reason of political and military events, has taken a unique place in the history of Arctic research. Preparations for the expedition started on Christmas Eve 1938. For some time I had been working on Arctic nutrition and other northern problems and had completed plans for an expedition to North-East Greenland, the chief purpose of which was to study the presence of vitamins, particularly vitamins A, B_1, and C, in Arctic diet. Hearing that Professor Ahlmann, Principal of the Geographical Institute in Stockholm, intended to make a snow survey in North-East Greenland, in the same area where I had decided to make my laboratory for vitamin researches, I immediately offered him my assistance which was accepted. Detailed arrangements were made in the early spring of 1939.

We had selected the district around Clavering Island for the expedition, not only because of the glaciological work planned by Professor Ahlmann, and the abundant flora and fauna for my vitamin work, but above all because of the geographical knowledge of this part of the country, gained by the Cambridge Expeditions of 1923, 1926, and 1929, and later supported by aerial mapping in 1933 by Svalbardkontoret, Oslo.

The expedition was to consist of the following members: Professor Ahlmann, Backa Eriksson (meteorologist), Henry Rudi and Schjölberg Nilsen (hunters), and myself. Professor Ahlmann and Backa Eriksson were to return to Norway with the expedition ship on 15 August 1939; I, with Rudi and Nilsen, were to remain until the summer of 1940 to complete the work. At the end of August 1940 the investigations were completed and Nilsen and I left the country, while Rudi remained at our station, Revet, 74° 22′ N., 21° 53′ W.

The object of the expedition was threefold: glaciological, biological, and meteorological. Professor Ahlmann's glaciological plans formed the last link

in a long series of investigations, which he commenced in Jotunheim in Norway as early as 1918. His main problem was to determine the "glacial metabolism"; by which he means the amount of snow added to the glacier compared with the amount lost by ablation. So far surveys had only been made on glaciers with maritime conditions. There was reason to believe that conditions were different on glaciers in arid areas. Therefore he selected

Vintergata glacier on Clavering Island for similar investigations. While the annual precipitation on Vatnajökull is approximately 4000 mm. of water, it is of the order of 200 mm. at Myggbukta in North-East Greenland.

The chief object of the biological research was to determine the vitamins in Arctic foodstuffs. Besides the theoretical interest of changes in vitamin contents of Arctic plants and animal organs at different seasons, it is also of the greatest practical importance because unmistakable cases of scurvy and beri beri have been recorded among wintering trappers even up to recent

years. These vitamin determinations were to be checked by clinical tests and a nutritional survey was to be made at different periods of the year. A collection of organic and embryonic material from Arctic mammals was to be made for comparative anatomical studies at a later date, and finally a representative quantity of bear liver was to be preserved in order to ascertain the reason for its toxic effect, and if possible to isolate the active substances. The results of this work will be published separately.

Complete meteorological observations were to be made at our base, Revet, partly to establish the effects of different meteorological factors on the melting of snow and ice, and partly to discover the meteorological reason for the abundant flora and fauna.

A detailed programme was drawn up for scientific and practical work, based on the advice of men who had spent several winters in the area. We met with the very greatest interest and generosity both from official and private sources, and were given grants sufficient to ensure the realization of the expedition's objectives. My preparatory work was carried on at the Institute of Physiology of Oslo University, with the help of its Chief, Professor Langefeldt, successor of Professor Torup, who was responsible for provisioning both Nansen's and Amundsen's expeditions. It was Nansen's opinion that the fate of a Polar expedition depends, first and foremost, on the preliminary preparations, which are almost as interesting as the actual expedition itself.

During the spring of 1939 the preparations were completed in Oslo and Stockholm. The equipment was made as simple as possible and, above all, easy to transport. Laboratory apparatus was collected and packed. Specially suitable food and travelling provisions were obtained, including Swedish dehydrated food which was to be tried for the first time on this expedition. This proved excellent for travelling, but chemical analyses carried out during the expedition showed that the greater part of the vitamin content was lost. The method adopted at present appears to be far superior to that used in Sweden in 1938–39. Shipping arrangements were made by the Norwegian fur trade company, A/S Arktisk Naeringsdrift, which also produced dogs, sledges, and other Arctic equipment; we picked up two dogs at Tromsö and the rest at Myggbukta. When in June 1939 our equipment was sent to Aalesund, it weighed 3½ tons. We could have opened a village store with everything from shoelaces to motor boats.

On the morning of 13 July 1939 all our equipment was brought on board the 260-ton sealing vessel *Polarbjörn*, commanded by the well-known sealing captain Kristoffer Marö. On July 15 we left Aalesund harbour, and for three glorious days we sailed northwards along the coast of Norway. As soon as we were well away from the coast we set course for Bear Island and were favoured with glorious weather for the whole voyage. We fished for cod on the banks near Bear Island, and steamed northwards with the current, along the coast of Spitsbergen with its jagged mountains and enormous glaciers. Early in the morning of July 22 we came into Kings Bay harbour. Drifting icefloes and bergs were reflected in the shining green water. At the end of the fjord Kings Glacier (Kongsbreen) shone in the morning sun. We started

the day in Kings Bay with a breakfast at the world's northernmost hotel, Nordpolhotellet (lat. 80° N.), which had every comfort.

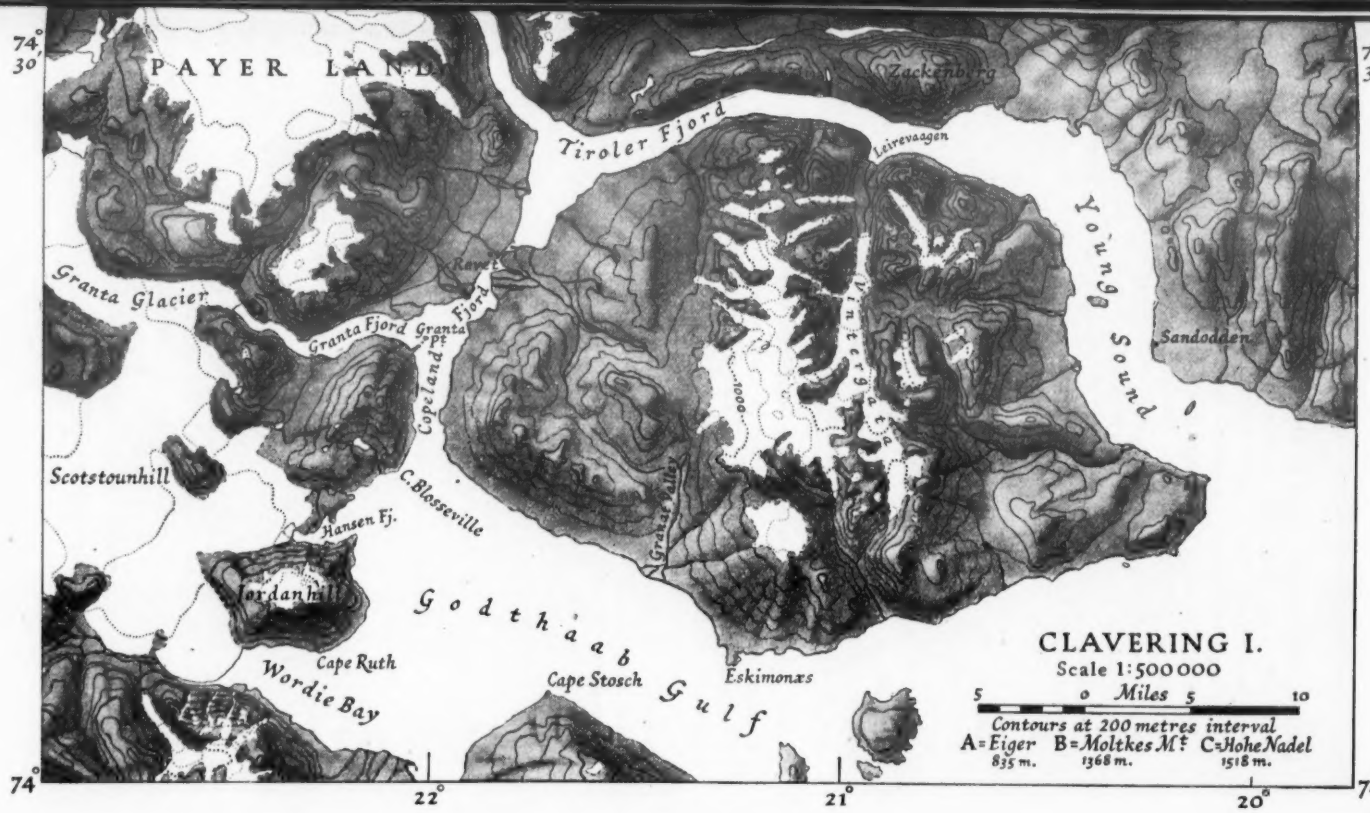
Our original plan was to force the ice-belt as far north as possible, so as to come in under the Greenland coast at 80° N. We hoped to reach Micardbu, where the French Count Gaston Micard and his companions wintered in 1938–39. We had heard that their ship *En Avant* was fast in the ice, and help might be necessary. We reached 82° N., and found open sea as far as we could see towards the Polar Basin. Farther west however we met pack-ice in thick mist, and were forced to turn south. At 74°–75° N. where the Arctic current usually makes an opening in the pack-ice, we slipped through and sighted the snow-clad mountains of Greenland on the clear night of July 27, setting our course for Cape Herschell. At the foot of the mountain the station with the Norwegian flag flying stood out in contrast with the snowfields behind. A boat put out and the hunter Hermann Andresen, who carries the title "Greenland's greatest teller of tales," came on board to receive the news from home.

We had planned to disembark the summer expedition at Leirevaagen, on the north side of Clavering Island, and from there to carry on glaciological research on Vintergata glacier, with the help of dog-teams and experienced hunters. The winter ice however had not yet broken on that side of the island, so we were compelled to go round the south of the island to the winter station Revet, where I later set up my laboratory and spent the winter with Rudi and Nilsen.

At Revet all our equipment was landed under extremely difficult conditions. The coast was shelving, and the sea rough. The summer expedition's equipment was transported to Leirevaagen by motor boat. Here we had bad weather and two of the boats were swamped and two of the less important instruments were damaged, but we were able to repair them later. After many difficulties we finally landed the equipment, dogs, sledges, skis, tents, instruments, and provisions for a month. Much drudgery lay ahead before our problems here were solved, and the summer expedition completed, some three weeks later. The coast was bare of snow and impassable for dog-teams. After a great deal of reconnoitring, we decided to set up a base camp at the coast, from which we could transport the material for a meteorological and glaciological station up the glacier.

It caused us a great deal of trouble to get the instruments transported to the meteorological station. There were long rocky slopes and steep gradients. We loaded ourselves with as much as we could carry, set off at daybreak over the rocky hillside, waded through glacial torrents, and scaled precipitous ridges of moraine, where the yellow Arctic poppy shone out among the stones. We scrambled over steep snowfields and perilous drifts of snow. We toiled over desolate arms of glaciers with crampons and skis. At the end of three days all instruments had been transported, the camp moved, and the observations were in full swing.

There were glorious days of sunshine when we enjoyed life with long ski runs over the wide glacier in bright sunlight and sparkling snow. There were times when the mist brooded over the mountains and confined us helplessly


PAYER LAND
Zackenberg
Tiroler Fjord
Leirevaagen
Young Sound
Granta Glacier
Granta Fjord
Granta Pt.
Cope Land
Fjord
Sandodden
Scotstounhill
C. Blosseville
Hansen Fj.
Jordan hill
Godthaab Gulf
Cape Ruth
Wordie Bay
Cape Stosch
Eskimonæs
CLAVERING I.
Scale 1:500000
5 0 Miles 5 10
Contours at 200 metres interval
A=Eiger 835 m. B=Moltkes M.t 1368 m. C=Hohe Nadel 1518 m.
74° 30'
74°
22°
21°
20°

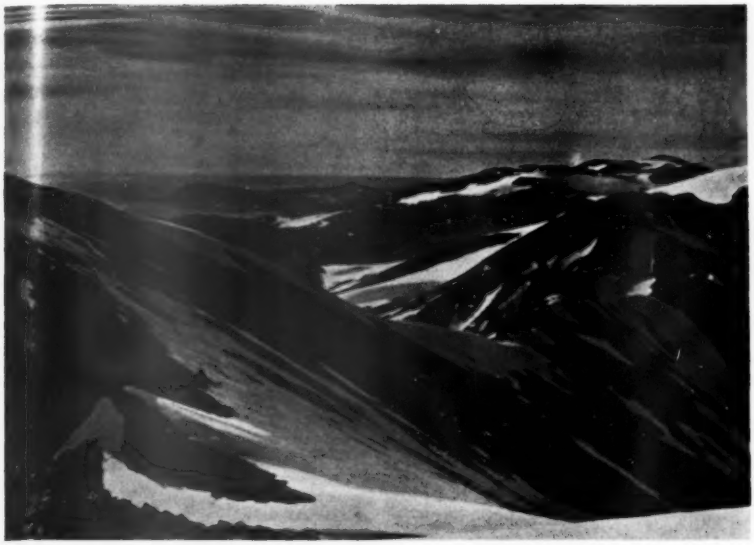
indoors. There were days and nights when rain poured; uncomfortable times, with a wet tent which became full of paraffin smoke and the smell of damp wool. Under these conditions the Arctic temperament is tested. In normal years rain is however rare in North-East Greenland.

When time permitted, we made short trips and climbed the higher peaks. From Hoche Nadel and Moltkes Mountain, which are difficult and dangerous to climb because of the frequent avalanches, we saw the pack-ice for miles to eastward, icebound fjords to northward, and to the west, behind the distant nunataks, the immense stretch of the ice cap that lay between us and the west coast. To the south was a gigantic mountain landscape, where huge glaciers ground together, ice-avalanches boomed, and there was no living thing. In the distance the Wordie glacier could be seen, with its numerous nunataks. We stood on the edge of a dizzy precipice; under us the Fröya glacier twisted like a furrowed tongue. In the clear northern air we could see for miles. A ship in the pack-ice, perhaps the Danish ship *Gustav Holm*, seemed to provide a most comfortable feeling of friends at hand. We saw steep slopes, where musk-ox grazed peacefully, and Arctic hares jumped rocks on their hind legs like baby kangaroos, and startled ptarmigan pecked the berries and buds of polar willow.

Owing to the limited time (the *Polarbjörn* was to call for Ahlmann and Eriksson on August 15) the planned work could not be carried out on the Vintergata glacier itself with the difficult transport conditions, and the smaller Fröya glacier nearer the coast was chosen. Continuous glaciological measurements were to be taken at different heights on the glacier. The increase by snowfall and decrease by melting and evaporation were to be determined by measuring alterations in size and depth. Notes were to be taken of the glacier's movements, and the consistency of the surface determined. Meteorological observations were to be made at the same time to determine how far the melting of the ice was caused by the sun or by the warm air currents.

We divided the work between us so that Backa Eriksson lived at the meteorological station at nearly 500 metres above sea-level, and made continuous meteorological observations, while Professor Ahlmann and I lived at Leirevaagen. Professor Ahlmann made measurements on the lower parts of the glacier, while I proceeded with similar measurements on the glacial plateau, some 1000 metres above sea-level. A meteorological station was also set up on the coast. We started early in the mornings after a breakfast consisting of porridge, dehydrated food, and coffee. From stake No. 4 (400 metres above sea-level) we were able to make use of skis. Food was carried up to Eriksson's camp from the base camp.

At various points on the glacier (see Fig. 1) stakes were bored into the ice to a depth of approximately 1·5 metres by means of a punching drill designed by A. Hamberg. During the drilling process the holes filled with surface water from the glacier, and a few hours after the stakes had been put into the water the water had frozen and held the stakes firm. All the stakes were of bamboo, 3·5–4 m. long, 3–4 cm. in diameter at the thick end. Each had a red and a black streamer at the top, as well as a number plate attached 1 metres above the ice or snow surface.



From Moltkes Mountain looking east, April 1939

Aerial photograph, 8 August 1932, at 2500 m.

Eigerhytta at Leirevaagen, March 1940. Vintergata glacier in background

Ahlmann and Rodahl on Fröya glacier at 900 metres, stake 15, digging pit for firn measurements. Looking west

Meteorological station, Revet, looking towards Payer Land. Snow gauge, actinograph, and screen

The specific gravity of the snow and ice was determined at the various parts of the glacier. On August 2 a Devik ablatograph of improved design was mounted on the same level as stake No. 5 and was dismounted on August 13.

When stakes 8–16 were put up on August 3, the thickness of the snow and firn remaining from the budget year 1938–39 was determined in pits dug in the position of the stakes and along lines through these right across the glacier.

The movement of the surface of the glacier was measured by theodolite readings of the position of the stakes in relation to fixed points on the mountains. Hardly any movement was found during a period of fourteen days in the summer of 1939. During the summer months, as the melting was at its maximum, the distance in centimetres between the number plates and the ice or snow surface was measured at short intervals. Notes were also taken as to the consistency of the snow or ice. In the table the results are given of readings from stakes 2–15 from 4 September 1939 to 17 August 1940.

Stake	4.9.39– 15.7.40	15.7.40– 24.7.40	24.7.40– 6.8.40	6.8.40– 17.8.40	4.9.39– 17.8.40
2, 3	>70	52	39	17	178
5	72	37	—	—	—
6	67	50	—	10	>127
7	69	46	44.	31	190
8	41	44	24	1	110
11	34	21	—	12	>67
12	15	32	23	17	87
13	−8	18	43	6	59
15	−17	1	31	3	18

Distance in cm. from glacier surface to number plate.

After the work of the summer expedition was completed we had to wait patiently for the *Polarbjörn* which, as we afterwards learned, had got into difficulties with ice in Franz Josef fjord and was delayed a few days. Our exhausted supplies necessitated heading for Revet, where we continued to wait. In the meantime we were visited by the Danish wireless operator from Eskimonæs, and two Eskimos from Scoresby Sound.

When I now look back on these times, upon weary journeys in icy winds when the dogs refused to go on; on all the times when we had to go forward and clear the pathway for them, pull the sledges together with them, swim with them in the slush on spring ice, and the long dark months when we worked together at the base I cannot refrain from sending my warmest thanks to my two companions, Rudi and Nilsen. Rudi had spent twenty years in the Arctic, in Spitsbergen, North-East Greenland, Franz Josef Land, Jan Mayen, and Novaya Zemlya, and he had killed more than seven hundred polar bears. In 1908 he went on his first winter expedition, hunting bears at Spitsbergen. He found new hunting grounds at Spitsbergen; he followed the bears' yearly trail along the ice border from Franz Josef Land to the Greenland coast and

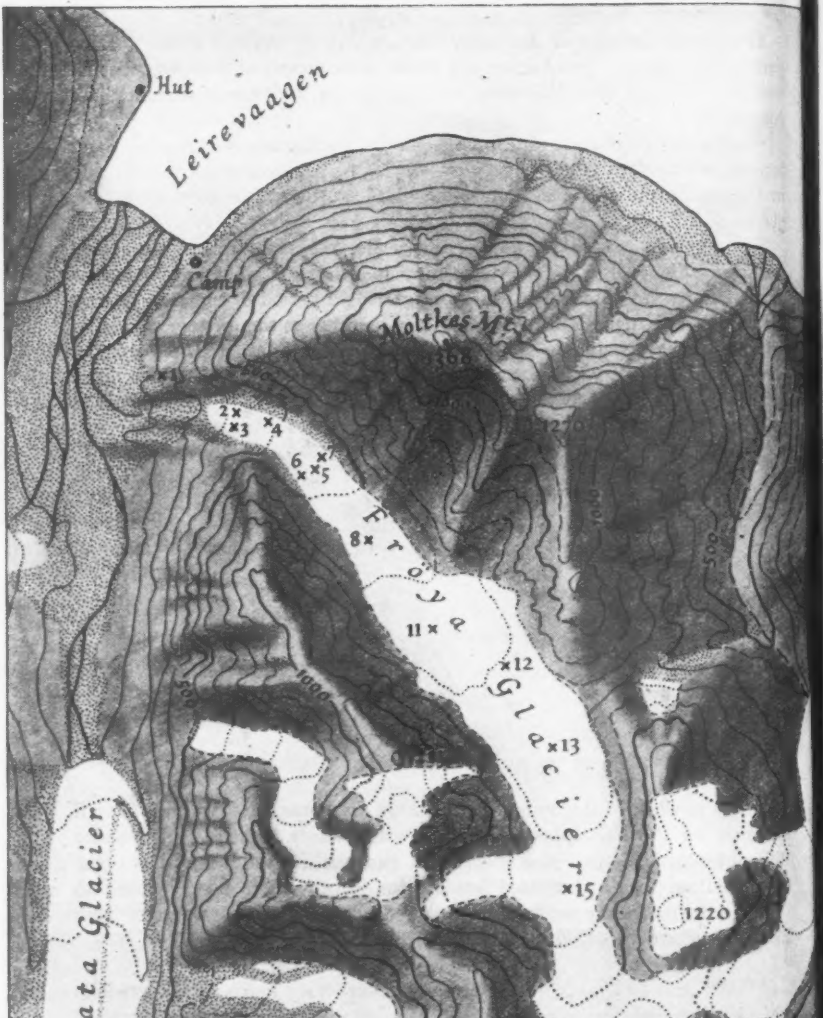


Diagram showing Fröya Glacier and the surrounding country. Numbered cross indicate position of the stakes on the glacier

was among those who tried their luck with fox hunting and salmon fishing at Sjoldung in South-East Greenland. He spent a year in the inhospitable island of Jan Mayen, where the blue fox was so tame that the trappers even managed to catch live foxes in empty barrels outside the hut doors. Rudi is one of Norway's oldest wintering veterans.

Nilsen was a sturdy, solid, conscientious fellow. He had great experience from six years of winters in the Arctic, was an efficient team driver and an excellent companion, always helpful and kind, calm and level-headed. He was exactly the kind of man one likes to meet in the Arctic.

Opposite Payer Land the Clavering Island glaciers have made a delta where one can walk dry-shod across from the mainland to the island at low tide. This strait is called Revet. The country is flat with grassy slopes up the mountain ravine, where the musk-ox feed in large numbers on their periodical wanderings. The region has been considered one of the best hunting grounds on the coast. The vegetation is rich and unusually luxurious, and the animals have, up to recent years, been described as particularly representative. There are streams rich in salmon, swarms of hares, and ptarmigan everywhere. There were plenty of seal in the fjord, and bears wandered in occasionally. The climate is very favourable, and the going, as a rule, good. The winter is dry and cold. Numerous ruins of Eskimo huts show that Revet has for long offered good living conditions.

The first trappers wintered here in 1926–28. They were Sundmöre men, who tried their luck in a little earthern hut. In 1928 two members of the Norwegian Greenland Expedition of 1928–30 built a rather bigger hut on practically the same site. They wintered here two years and had excellent hunting. Since 1932 Gerhard Antonsen had wintered at Revet, as trapper for the A/S Arctic Naeringsdrift, Oslo. In 1938 he made the record catch with four hundred foxes in one single season.

The station is beautifully situated on a hill by the sea, surrounded by slopes, with mountains on all sides. High grass grows on the sunny slopes round the hut, and Arctic poppies shine out among heather and moss in the hollow. Four fjords converge here, and give great opportunities for seal-hunting; to the north Tiroler fjord and Trang fjord, with their steep crags and calving icebergs, to the south Granta fjord and Copeland fjord with their reddish granite rocks.

The hut itself has rather a melancholy look. It reminded me of an old-fashioned summer stable in the country with peat-thatched roof and earth walls. It was sloping and slanting all ways, and it would not have surprised me if it had come tumbling down. The floor sloped so much that we could never fill our soup-plates full. In a little outbuilding with a floor space of 6–9 square yards we fitted up the laboratory. There were cupboards, shelves, test-tubes, glasses, instruments, scales, and vacuum pumps. At the end of two weeks' feverish work everything was in place and the work in full swing according to the detailed plan.

The Arctic summer is short, and there was much to be done before the fjords froze and the snow covered the land. A meteorological station was built at Revet, where, three times daily all the year round, we took readings.

Besides the everyday work in the laboratory all the necessary preparations were made to meet the winter and the long darkness. Provisions were brought indoors and cases opened. Paraffin oil and bags of coal were carried to the hut so we could find them near at hand when the snow came. All unwanted boats were beached and made fast. In the evenings we worked in lamplight on travelling equipment and fur garments. We fashioned cloaks and sleeping-bags of reindeer skin, sealskin trousers, sheepskin socks, and mufflers. While the weather held, and before the autumn storms began, we hunted for seal in the fjords and killed musk-oxen for food for ourselves and the dogs. These trips in the last days of August are among my happiest memories of Greenland. The air was clear and cold. A thin skin of ice was beginning to form in the fjords, and the seal felt secure. During the numerous motor boat trips depots were set up with provisions and dog food in the regions we were to travel through later. Musk-ox hunting, or rather killing, for it is after all no sport, is the saddest work one is called upon to do in the Arctic—with the exception of shooting one's own dogs. The creatures just stand with majestic calm and await the shot.

The plan for the glaciological measurements necessitated an ascent of the glacial plateau in September, when melting and evaporation processes would be at a minimum. On 3 September 1939 we packed equipment and provisions for a week's trip in the motor boat, and at sunrise the next morning we left Revet. We arrived at midday at the hut at Leirevaagen. My companions went on to Cape Herschell to hunt walrus. After making the necessary preparations, I sailed over the bay and beached the boat at the mouth of the glacial river. I took my skis on my shoulder and set off. I reached the first measuring point at the foot of the glacier and rested. Far beneath me twisted greenish-white glacial rivers in a jagged moraine landscape. From time to time falls of rock thundered down the mountains east of the bay, the cloud of smoke rising sky-high.

Big changes had taken place in the glacier since I had last been there. Bottomless, blue-black crevasses gaped where we had thought ourselves on firm ground. On the lower portions of the glacier I had to use crampons. I passed the worst areas of fissures and could begin to use skis. At dusk I came to the highest point of the plateau and started off down the glacier on skis. The track widened, crossed, twisted, I jogged through pools of water and crusted snow, skidded over sheet-ice and invisible ridges, and crossed crevasses. It was dark when I clambered over the last rock fall and followed the moraine ridge down to the sea. For the first time I experienced the real, boundless loneliness. I set my boat on the water and rowed back to the hut while the moon strewed silver dust over the bay and phosphorescent lights twinkled in the wake of the boat.

One morning in the middle of September at 8 a.m., when I was taking the meteorological observations, the year's first snow fell. The grass looked almost spring-green where it showed through the white snowy covering. In an enchanting manner the whole landscape changed its character in a few minutes. The change was cheerful, and the dogs licked each other; they

Hut at Revet, looking towards Clavering Island, spring 1940

Revet looking north-west. Separate huts for dogs; modified Nansen-type sledges as used by European trappers

Interior of hut at Revet

Looking down Copeland fjord from hill south of Revet, Cape Stosch in background, Clavering Island to left, Blosseville mountain and Granta fjord to right

Phot. G. Antonsen

Clavering Island from Payer Land. Revet is in centre of photograph

knew that the time was not far off when they would race over a good track out over the great flat plains towards the Arctic sea.

There were fresh ptarmigan tracks on the river banks. Mountain ptarmigan always move down to the coast, where they can find food, when the first snow comes. The little band of animals and birds who refuse to leave their Arctic homes took on their winter coats and prepared themselves for the struggle. A solitary stoat who had dug itself in under our hut, and stole meat on a large scale for its winter provisions, suddenly appeared one day in its white winter coat.

At the end of September the Danish police inspector from Eskimonæs paid our station a visit. He had taken the road across the Clavering Mountains and had climbed that difficult track in twelve hours in tennis shoes. His companion, accompanied by an Eskimo, had wrecked his motor boat in Loch Fyne during a musk-ox hunt. They had rowed home across Copeland fjord in a little dinghy. The Dane had now come to get help for salvaging the motor boat.

In order to collect scientific material, numerous trips with sledge and dogs were made during the winter. Altogether I covered by sledge and skis more than 3000 kilometres. We paid regular visits to the Danes at Eskimonæs, who had wireless connection with Myggbukta radio at Mackenzie bay. Both during the winter and during early spring I made several trips to Mackenzie bay to report home the progress of the work. We usually travelled alone, and arranged it so that there always was one at home to look after the instruments, the laboratory reagents, and the dogs.

I particularly remember one trip to Mackenzie bay which I made just before Christmas. I left Revet on a moonlight morning in December with eight dogs in a team. The weather was clear and the visibility quite good. I crossed the mouth of Granta fjord to Cape Blosseville, crossed Hansen fjord, and headed for Jordanhill. I wanted to stop overnight at the Danish cabin at Cape Ruth, where I expected to find the Danish wireless operator from Eskimonæs, Ove Jensen. The previous Saturday he had informed me by wireless that he was going to visit the Norwegian wireless operator at Mackenzie bay. In the early afternoon I reached Cape Ruth, where I met Jensen, who was busy repairing his sledge. The previous night he had gone through the ice trying to cross the glacial river in the bottom of Wordie bay to reach the Promenade valley, where he had some fox-traps, and had broken his sledge, which was heavily laden. The moon was so bright that we could easily carry on the work without any artificial light. We fed the dogs well on old pemmican, which had been there since Lauge Koch passed here on his trip to Danmarkshavn in 1932. For ourselves we prepared pea-soup, smoked ham, stewed liver, bread, butter, and chocolate. While we were there the temperature suddenly started to rise, so much that it made us feel uncomfortable. Waves of hot air came down the bay. I had only once had a similar experience and that was on the Frōya glacier. During the night the wind developed into a gale. Stones and sand rained down upon the hut, which was built at the foot of a mountain, upon a hill. I expected every moment that the hut would become airborne.

In the morning we found all our equipment and the dogs down on the fjord ice. We set off immediately after breakfast. A heavy wind was blowing out of Wordie bay towards Cape Stosch. All the snow was removed from the ice. We rigged up sails on the sledges, and went faster than the dogs could run. In sixty minutes we had crossed the Copeland fjord, and were at the cabin at the mouth of Loch Fyne. In the evening we made our tent on the west side of Loch Fyne, near the end of the loch. The temperature was approximately −50° C. We had a single-walled Nansen tent with a floor. We placed the reindeer sleeping-bags on top of the fur coats, heated the bread and butter so it could be eaten, and kept the primus going to heat the tent. I have spent many nights in a tent or even without a tent in the Arctic, but never felt the cold as I did that night.

During the evening we passed Bunnhuset in Loch Fyne and continued across the tundra country between Loch Fyne and Mackenzie bay. We followed the valley and kept on south. To keep warm we had to run beside the sledges. From one of the moraine ridges we saw a tiny light due east which could only be Mackenzie bay wireless station (Myggbukta). We headed for the light, and arrived at five o'clock in the morning, and found the wireless operator in bed. He had left the light on to keep the polar bears away, he said.

Myggbukta is one of the most important meteorological stations in the eastern Arctic. During twenty years weather reports have been sent from here to Europe. It is also the centre of communications between the wintering trappers and the civilized world. We were held up in Myggbukta a few days by a snowstorm. At last we could set off, and crossed the tundra partly by following certain valleys, and partly by compass. We reached Bunnhuset late in the evening, and spent the night there. While it was still dark the next morning we left a note in the hut and proceeded northwards along the east side of Loch Fyne. At several points we crossed bear tracks and when at noon we reached Midthuset, we discovered that a bear had knocked down the outhouse and one wall in the hut. All the dog meat had also disappeared.

As we came nearer the mouth of Loch Fyne the snow became deeper, and we advanced slowly. It was late when we arrived at Willaen. It started snowing, and it continued to snow during the night. In the morning it was blowing a gale. We could hardly see 3–4 yards in front of us. Nevertheless we made the sledges ready, and decided to make an attempt to reach Cape Stosch, as we wanted to be home for Christmas Eve. Jensen started first and I followed. In less than a minute we lost each other. The snow was deep, and we moved into the wind. I tried to follow the coast-line, but had to give that up, and followed the direction of the wind. After a few hours the dogs could not see any longer, and they began to be tired. Over and over again they refused to go on. I continued for a few hours more, and as I rounded a huge block of ice, I ran into Jensen, who was busy studying his compass. With a great deal of luck we reached Cape Stosch that night. Here we had hoped to find dog food, but there was only a small amount of seal blubber. For ourselves we had only a small loaf, a little butter, and a few pounds of flour, out of which we made a sort of pancake. The third day it was still

Dog
grou

On Copeland fjord sailing towards Granta point, Granta fjord to right

Looking down Tiroler fjord, Payer Land to right

Dog-team in Franz Josef fjord, April 1940. Waltershausen glacier in background. European harness, fan-method of driving

Fox-trap on tundra country between Loch Fyne and Mackenzie Bay, spring 1940. Looking west

Smoking salmon, Revet, looking towards Clavering Island, summer 1940

Polar-bear trap, 'Selvskudd,' on iceberg, Franz Josef fjord, spring 1940. Trigger of gun in back of box is tied to piece of blubber; when bear takes blubber shot is fired into its forehead

snowing heavily, but the wind had calmed down. We could only see a few yards in front of us, but as we had no food left we decided to try to cross Copeland fjord to Clavering Island. In the evening we reached land near the Granat valley, which is near Eskimonæs. Here we parted; Jensen, who would be home within a few hours, gave me one of his best dogs, and I followed the coast to the west. In the early morning I reached Revet.

In view of the difficulty of reaching the Fröya glacier from Revet at times when the fjords were freezing, or the ice on them breaking up, and of travelling up the glacier during the polar night to read the stakes, no glaciological observations were to be taken until February 1940.

On February 23 at noon I left the station at Revet by sledge and dogs, and arrived after three hours at the hut at Leirevaagen. The weather and the going were very good. I spent the night in the hut, and in the following morning, while it was still dark, I proceeded on skis towards the glacier. The snow was deep and it was heavy going. All the stakes were found in proper order. The average increase of the glacier was less than 30 cm. On the lower parts of the glacier the snow was hard packed. At the foot of the glacier the surface water and the glacial river had made a great frozen lake. Not a living thing was to be seen, except two ptarmigans, on a moraine ridge.

On March 25 another ascent was made. Hardly any change had taken place on the glacier since I had been there last. It was very cold although the sun was shining through a thin haze and curtains of fog passed over the mountains.

During the months of March and April conditions were very good for sledging. In order to collect material and to carry out nutritional surveys with different groups of trappers, I made several journeys both to Norwegian and to Danish posts.

From April 1 till April 15 I visited all the stations from Revet to Franz Josef fjord. I crossed the Tobias valley from Loch Fyne to Knudshoved, followed the coast to the south, crossed Hold with Hope, and came to Myggbukta just in time to receive my last message from home. A week later, when I arrived at Hoelsbu, in Moskusokse fjord, the Germans had invaded Norway and we were cut off from any communications with most of Europe.

From Myggbukta we crossed Franz Josef fjord to Cape Humboldt, and then to Strindberg, where salmon fishing is carried out during the summer by trappers from Myggbukta and Hoelsbu. More than fifty barrels of salmon have been caught here during one season. At Strindberg we completed our rations with tinned food from the depot. We also made various trips from there along the coast and up the Strindberg Valley. In the bottom of Nord fjord we passed Waltershausen glacier where Höygaard and Mehren came down after their crossing of the Inland Ice in 1931. From Hoelsbu we went direct to Myggbukta, by way of Moskusokse fjord and across the tundra. That time I made the journey from Myggbukta to Revet in thirteen hours.

A third journey was made to the Fröya glacier on April 24 and 25. The snow was already melting in the sun on the moraine ridges. On the fjord ice I saw a few seals. The result of the measurements on the glacier showed

practically no change since March 25. The snowfall that winter was particularly small.

On May 11 we were visited by the hunters Tollefsen and Sievers, the former had spent the winter up north at Peters bay, the latter was stationed at Mackenzie bay. Together with Nilsen (Rudi was at the time at Eskimonæs) we went with three dog-teams to look for a herd of musk-oxen, which had previously been observed by Nilsen at the head of Hansen fjord. Hundreds of seals were observed on the ice. Unsuccessfully we tried over and over again to get up to them. It was a bright day, the midnight sun was so warm that we could drive along in our shirt sleeves. Large gaps had formed in the ice across the fjords, and at high tide they could be crossed only at certain places. As we came under the north side of Hansen fjord we could see the musk-oxen on the slopes, and some on the top of high rocks near the fjord. From our position they made a good target, and as we opened fire, four of them fell down the mountain side, and landed on the ice, where we skinned them and loaded them on to the sledges. We came home to the base early in the morning. At this time of the year there is not much difference between day and night. After three hours' rest, I started off from Revet with fresh dogs at 8 a.m. and reached Leirevaagen in less than three hours. I made myself some coffee, fed the dogs well, and at 12 a.m. set off for the glacier. The glacial river at the end of the fjord poured water on the fjord ice. The snow was melting fast; small rivers were running down the mountain sides, and also on the glacier itself. On the lower parts of the glacier there had been some melting, but no change was observed on the glacial plateau. The same evening I returned to the hut in Leirevaagen, and left almost immediately for Revet, where I arrived just after midnight on May 13.

According to the plan, I was to reach Leirevaagen by sledge and dogs in the beginning of June. I made several unsuccessful attempts: over and over again I had to return to the base with soaking wet equipment and bleeding dogs with deep cuts in their pads caused by the sharp ice-needles. The fjord ice had split up into several icefloes. The melting proceeded rapidly from day to day. I hoped to be able to reach Leirevaagen by boat, rowing between the coast and the icefloes, but an easterly wind had driven the ice into the fjord, and made this impossible. Daily we climbed the hills above the station to watch the fjord ice. I tried to cross Clavering Island by foot, but this was also impossible because of the great glacial river. On June 25 we tried to reach Granta Point by boat. Part of the way we pulled the boat across the ice. After several hours we had to give up, and returned to Revet. Two further attempts were made on June 26 and 29.

On July 14 the wind changed, and removed all the fjord ice. The same day I went by rowing boat to Leirevaagen, which I reached after many hours of hard struggle against wind and current. The next day I climbed on to the glacier where enormous changes had occurred. Most of the rivers were already dried up. Nearly all the snow had disappeared from the lower parts of the glacier. There were many crevasses, which were difficult to cross. Two of the stakes had disappeared and new holes had to be made. The average decrease in the depth of the glacier since May 12 was approximately 60 cm. When I came down to the hut in Leirevaagen a strong breeze was

blowing in Tiroler fjord. I therefore decided to sail, and arrived at Revet in the early morning after an exciting trip.

Another measurement was made on the glacier on 23 July 1940. I started in the evening from the hut. The mountain peaks were hidden in a thick fog. As I climbed up the glacier the fog became thicker. I reached post 8, at 800 metres. The fog was then very thick, and I had lost my bearing. I found my way down the glacier by following the small glacial rivers. The next day I tried again, and succeeded in inspecting all the posts on the glacier. After twelve hours' rowing in unfavourable weather I reached Revet.

On 2 August 1940, having waited for some time to receive news of a supply ship from Europe, I decided to return to Leirevaagen again for a further inspection of the posts on the Fröya glacier. We were already short of many things, chiefly coal and petrol. On August 3 Rudi returned to Revet from Zackenberg, where he and Nilsen had been salmon fishing. Together we decided to go to Eskimonæs in an effort to contact the civilized world by wireless. This attempt was without success, and on August 5 we went by motor boat to Leirevaagen. Rudi went to Zackenberg the same day, while I went up the glacier the following day. I carried out the routine measurements, and checked the various posts. According to the plan I should have remained at Leirevaagen until the glaciological work had been completed, but as a supply ship might come in to Revet *via* Copeland fjord round the south side of Clavering Island, and Rudi and Nilsen were busy salmon fishing at Zackenberg, I decided to return to Revet. Before returning I visited my companions at Zackenberg, and the Danish hunters at Sandodden. It was already late in the summer. As far as we could see eastwards from the highest mountains there was no opening in the pack-ice. The wind had been blowing from the east all the time, pressing the ice towards the coast. The situation was very discouraging. We did not have sufficient food for another year, and, above all, we had only a few sacks of coal. We had two possibilities in case no ship should arrive: we could go south to Scoresby Sound on the first winter ice in the autumn of 1940, or we could cross the ice-cap to the west coast of Greenland, and from there reach supply ships from America. This would mean an unusual expedition which could not well be organized and carried out until the early spring of 1941. However neither of these plans were necessary.

One evening early in August 1940 I happened to pick up a strange radio message from a ship which must have been quite near the Greenland coast in the pack-ice. I then discovered that the Norwegian sealing vessel *Veslekari* was on the way to North-East Greenland with a fresh supply of fuel and food. On August 11 the *Veslekari* arrived at our station, followed, less than a week later by three more ships.

On 17 August 1940 I paid my last visit to the Fröya glacier. For the last time I climbed the same old route. At the last post, number 15 at the top of the glacial plateau, I wrote a message and attached it to the post, from which a white and red flag was flying, and enjoyed for the last time the exciting ski-run down the glacier. Shortly after Nilsen and I left the country.

A few of the trappers preferred to remain in the Arctic, among them Rudi, our companion at Revet. We arrived at a port on the north-west coast of

Iceland, from there we went to Reykjavik and later to Scotland, arriving at the Orkney Islands on 8 September 1940.

With regard to the glaciological and meteorological material obtained during these months, Professor Ahlmann will draw the final conclusions. I shall merely note that on the glacial plateau itself the glacier had decreased in depth some 60 cm. from September 1939 to August 1940, while on the lower parts of the glacier it had decreased between 1 and 2 metres. This should be in agreement with the figures found for Vatnajökull in Iceland. The results based on observations made during Professor Ahlmann's stay in the summer of 1939, and further data collected by me up to 15 July 1940 and wired to Professor Ahlmann in Stockholm *via* Myggbukta Radio are already published by him: "Studies in North-East Greenland 1939–40, parts I–IV," *Geografiska Annaler*, h. 3–4, 1941, and h. 1–2, 1942. The supplementary data have now been sent to Professor Ahlmann.

An easy code was arranged for me to cable my results from Myggbukta or Eskimonæs to Professor Ahlmann in Stockholm, who cabled his replies similarly to Myggbukta, from where they were broadcast once a week to the small receiving set at Revet.

Biological work

During the expedition much biological material was collected, such as series of brain specimens and foetus from Arctic mammals. The laboratory work was carried out in spite of several technical difficulties, among which the cold was the greatest problem. Some of the results of the laboratory experiments have already been published.[1]

During the dark period of the year (November–February) the European trappers in North-East Greenland generally showed symptoms of debility and inertia, and complained of lack of initiative. It is suggested that this might be due to a mild form of vitamin C deficiency, following a decreased food intake during this period. There is reason to believe that the marked lack of appetite and chronic fatigue observed might be explained as a result of vitamin B1 deficiency. According to my figures the European trappers in Greenland are on a B1-deficient diet throughout the year. Cases of beri beri which have been recorded among European trappers in North-East Greenland support this (Höygaard and Rasmussen, 1937).

To ascertain to what extent vitamin deficiency might apply to the health of the Arctic hunters, I made a comprehensive study of the diet during four periods of the year of thirteen Norwegian trappers along the coast from King Oscar's fjord to Peters bay, divided into six groups. The food supply in each group was very similar, and was produced by the hunting company, Arktisk Naeringsdrift, Oslo. A preliminary investigation showed that the food consumption in the different groups was fairly equal, and this was verified by checking the total food consumption during the whole year of the different groups. A representative group of three trappers stationed at our base was therefore investigated during the four seasons of the year. None of the

[1] K. Rodahl and T. Moore, "The vitamin A content and toxicity of bear and seal liver," *Biochem. J.* 37 (1943) 166–8.

individuals investigated suffered from any illness. Some of the preliminary results of these studies are given in the following table, which shows the vitamin intake, per man per day at different periods of the year.

1939–40	*Food*	*A*	*B*1	*C*	*D*
I. Oct. 3–18	1203 gms.	5503 i.u.	362 i.u.	12·2 mg.	288 i.u.
II. Dec. 31–Jan. 17 ..	851	1448	254	8·7	260
III. Apr. 28–May 17 ..	1123	2289	273	23·0	49
IV. June 15–30	1274	3300	294	11·2	317
Mean	1113	3135	296	13·8	229

The average consumption per man was 2904 calories per day, varying from 3347 in the summer to 2118 in the middle of the winter. This result is surprising in view of the fact that many Arctic travellers have suggested that at least 5000 calories would be necessary under Arctic conditions. However really hard work is done only occasionally, for instance during travelling by ski under difficult conditions.

Compared with the Canadian Dietary Standard (McHenry, 1941) the consumption of protein is slightly higher, and of fat much higher, than the standard. The consumption of carbohydrate is comparatively low. The diet is more a fat diet than a carbohydrate diet. The average consumption of calcium, phosphorus, and iron is higher than the Canadian Standard.

During Period I, vitamin A was obtained through the ingestion of eggs (50 per cent.), butter (25 per cent.), cheese (10 per cent.), milk (6 per cent.), and margarine (6 per cent.). Based on the generally accepted daily requirement of 3000–4000 i.u., the intake of vitamin A is above normal requirements. During the second period, midwinter, at which time there is practically no daylight, the intake falls much below normal requirements. There is no consumption of eggs, approximately 67 per cent. of the vitamin A intake is from butter—milk and margarine forming the other main sources. In the spring and summer (Periods III and IV) the vitamin A consumption still remains at a low level; the more important sources consisting of butter, milk, margarine, herrings, and cheese.

If 400 i.u. vitamin B1 (as recommended by Rose, 1933) is considered the normal requirement of average adults, the Greenland trappers are on a B1-deficient diet during all four periods. This might explain the loss of appetite which usually occurs during the winter.

The consumption of vitamin C during all four periods was less than the figures considered as the normal requirement. In the middle of the winter the intake was less than 10 mg. ascorbic acid per day per individual. No obvious symptoms of scurvy were observed. These findings are in agreement with observations made by Höygaard (1929), who, during sledging journeys of long duration in the Arctic, subsisted on less than 15 mg. ascorbic acid per day without any ill effect.

Vitamin D is of less importance as the European trappers in North-East Greenland are all male adults.

Scurvy is not known among the East Greenland Eskimos. Study of the Eskimo diet shows that they satisfy their need of vitamins from internal

organs of animals, Arctic plants, and seaweed. My experimental results showed that the native flora and fauna is extremely rich in these vitamins, and that there is therefore no reason for suffering from a deficiency without any supply from outside.

Climatical conditions in the Arctic make it necessary for the Eskimo to have a thicker layer of subcutaneous fat which maintains his body at a normal temperature. He therefore has a much higher fat consumption than the Europeans. Necessity developed in him a fondness for seal blubber, that is now hereditary. Through generations he developed the ability to assimilate large amounts of fat. It is clear that the Eskimo is so specialized and adapted to his own way of living that any change in the environment would mean the destruction of his race, and this in my opinion is happening to the Eskimo to-day. The white man has given him the rifle—the harpoon is now forgotten—and sugar, bread, alcohol, and even butter form part of his daily diet. Thus his diet is becoming increasingly of a carbohydrate nature, with the result that the Eskimo is becoming unsuited for the Arctic conditions under which he lives. Epidemics of tuberculosis and influenza are frequent and dental caries which formerly occurred only in isolated cases is now common.

Since my return from the expedition to this country, I have received much assistance from the Scott Polar Research Institute for which I am most grateful. I wish to thank Mr. J. M. Wordie and Mr. N. E. Odell for their advice during the working up of material from the expedition, and also Dr. L. J. Harris and Dr. T. Moore, who kindly arranged laboratory facilities for me at the Dunn Nutritional Laboratory, Cambridge.

DISCUSSION

Before the paper the PRESIDENT (The Rt. Hon. Sir GEORGE CLERK) said: Our lecturer this evening, Mr. Kaare Rodahl, was a medical student of the University of Oslo who accompanied our Gold Medallist, Professor Hans Ahlmann, of Stockholm, on a joint Swedish–Norwegian expedition to North-East Greenland in 1939, and when Professor Ahlmann had to return in the autumn to his duties in Stockholm, Mr. Rodahl undertook to carry on his glacier studies as well as his own particular medical work on problems of nutrition. The invasion of his country in the spring of 1940 made it impossible for him to return to Norway, but after some adventures he succeeded in getting away from his Arctic laboratory in Greenland and is now a member of the Norwegian Parachute Company in the Air Borne Division.

The earlier results of Professor Ahlmann's glacier work have been published in Sweden and a single copy has reached this country. It will be a particular pleasure to hear from Mr. Rodahl to-night how he was able to continue Professor Ahlmann's work and to know something also of his own studies.

Mr. Rodahl then read the paper printed above, and a discussion followed.

The PRESIDENT: Perhaps I might ask Dr. Odell, who has had great experience of this part of the work to say a word or two.

DR. N. E. ODELL: I should like to say how much I have enjoyed the paper by Mr. Kaare Rodahl. It has brought back to me memories of North-East Greenland in 1933, when my wife and I were guests of Miss Louise Boyd on her expedition to those parts. The details Mr. Rodahl has given us in such eloquent

language, as well as his pictures, bring out some of the extraordinary beauties of that country. Those fjords of North-East Greenland are some of the most spectacular in the world; they are certainly the largest; and the scenic contrasts between the outer coast and the inner portions of the fjords, when one sails between the great mountains that rise so steeply 5000–6000 feet from the fjord waters, are something that are unequalled anywhere.

The extraordinary thing is that when you come in from that rather inhospitable barren coast-line with its cold "maritime" climate (what Professor Ahlmann has emphasized are the actual maritime conditions you get on the coast; westward, nearer the Ice Cap, the climate is continental), and land in one of the branch fjords or valleys, there is a most surprising amount of dwarf vegetation. Some of this vegetation Mr. Rodahl has shown us in his colour photographs; it takes on gorgeous tints in the late summer, and in the Gregory valley we found the blueberry plants, dwarf willow, and birch of spectacular colouring. In late summer we enjoyed the dessert of blueberry fruit which we were able to add to our meagre rations when we were getting a little short after various excursions into the mountains round the head of that valley. In other words, there was available an ample supply of Vitamin C, into the plant distribution of which Mr. Rodahl has been making some interesting researches.

I have had the good fortune to read the official report of this expedition by Professor Ahlmann, "Studies in North-East Greenland," published in *Geograf. Ann.*, 1941 and 1942.[1] It is a very comprehensive document. His references to some of the morphological features that are found in the country are of great significance. For instance, he lays considerable emphasis upon the idea that the twin terminal moraines of the Fröya glacier, where the detailed glaciological work was done, and where Mr. Rodahl continued the observations during the subsequent winter, probably correspond with similar terminal moraines that he and S. Thorarinsson in particular have examined at the ends of certain glaciers in Spitsbergen, in Iceland, and in the Jotunheim district of Norway. Thorarinsson lately in an important paper on "Present glacier shrinkage" (*Geograf. Ann.*, 1940) has emphasized the concurrence of glacier variation all over the world in recent centuries. Professor Ahlmann brings forward the thesis that these terminal moraines at the end of the Fröya glacier of Clavering Island, together with those of corresponding glaciers round the Norwegian Sea, probably mark the maximum extent of the post-Pleistocene glacierization. That is a point of great interest, because if these Fröya terminal moraines do mark the actual maximum extent of the glaciers during the whole post-Pleistocene epoch, to what period are we to assign the erratic material which Mr. Wordie found on some of the hills of Clavering Island at 2500 feet above sea-level, and the similar material that I found myself on the top of the remarkable mountain, the Teufelsschloss, over 4000 feet above fjord level, and 40 or 50 miles from the present borders of the inland Ice Cap? Can we safely attribute the deposition of the whole of this material to the maximum phase of the Pleistocene alone? It is to be hoped that further investigations in Clavering Island and elsewhere may settle this question.

Arising from this Professor Ahlmann puts forward the idea that the possible extension of the glaciers in the eighteenth and nineteenth centuries may have been responsible for a deterioration of climate sufficient to have brought about the disappearance of the last remnants of the Eskimos. It may be remembered that at the time of Captain Clavering's visit to the coast in 1823 he saw on the south side of the Island now named after him a few individuals of this Eskimo population, which since 1870 seems to have either died out or migrated else-

[1] Reviewed in *G.J.* 101 (1943).

where. At any rate from his own investigations I think Mr. Rodahl will agree that they did not die out from lack of available Vitamin A or C.

The PRESIDENT: I do not know whether Mr. Wordie would like to add anything to the points raised by Dr. Odell?

Mr. J. M. WORDIE: I do not want to say anything but to show appreciation of having another Greenland evening. It is like old times when we usually had a meeting of this kind every year when people came back from the region. I have enjoyed seeing Mr. Rodahl's pictures very much, particularly the coloured slides.

The PRESIDENT: I should also like to say that I am grateful, as I am sure we all are, to Mr. Rodahl and to Dr. Odell. They have put before us a country of, at least to me, unrealized fascination. When we think over the lecture we should remember what our lecturer went through while he was getting the material of which we have had the best proof this evening. It is a great tribute to anybody to have lived in such a country. I hope that when the war is over—a phrase I find myself using almost every time I come on to this platform—when this horrible war is over let us hope that Mr. Rodahl will be able to continue for very many years those researches which I am certain will prove of the greatest value.

HALÉVY IN THE YAMAN

H. StJ. B. PHILBY

DR. S. D. GOITEIN'S recent edition (reviewed in *Geogr. J.*, 99 (1942) 272–5) of a vernacular account of Joseph Halévy's 1870 journey to Najran "by his guide Hayyim Habshush" raises some interesting problems which, owing to the death of all the persons principally concerned, can probably never be finally solved. In its simplest form the question which presents itself for an answer is: Was Hayyim Habshush Joseph Halévy's guide? Dr. Hugh Scott, in reviewing the book for the *Journal*, appears to have accepted Habshush's claim at its face value; and I must confess that, when reviewing the work for the Central Asian Society (*J.R.C.A.S.*, 30 (1943) 325–7) without access to any relevant literature, it did not occur to me to question the *bona fides* of Habshush, whose claim, if established, would seem to reflect somewhat discreditably on Halévy himself. I felt however that there was something wrong, and I have since made a point of collating the accounts of the two men in the hope of finding an explanation of the matter.

Hayyim Habshush claims: firstly that he was Halévy's guide and companion throughout this famous journey from San'a to Najran and back; and secondly that, with only a few exceptions, it was he and not Halévy who copied all the inscriptions brought back by the latter. On the other hand Halévy never so much as mentions Habshush, never suggests that he had any companion at all on the journey apart from casual guides recruited from point to point and, even when he does not expressly mention the fact, certainly leaves the impression that all his inscriptions were copied by himself. This is of course literally true on Habshush's own showing, as he has stated

that Halévy always transcribed the copies of inscriptions brought in by him. Be that as it may, we are confronted by a serious conflict of claims on issues of fact, regarding which, so far as I know, there is none but the internal evidence of the rival accounts to help us in forming an opinion.

On certain points there is no doubt whatever. Halévy made the journey in question and brought back the inscriptions to Europe. On 6 September 1869, he was charged with a scientific mission to the Yaman by the Minister for Public Instruction in Paris. After an abortive visit to Aden and Lahj he proceeded to Hudaida, whence, on 25 November 1869, he started for San'a, arriving there on December 12. After a stay there of more than two months he left San'a on 15 February 1870 (or February 20 according to his official report). On June 3 he arrived in Najran just in time for Pentecost (June 5 and 6). These are the last exact dates we have from Halévy himself, as his account in the *Bulletin de la Société Géographique* (1873 and 1877) stops at this point, while his official report (*Journal Asiatique*, 1872) ignores all dates, although quite incidentally it does tell us that he was in Upper Jauf (at Jar al Labba) on his return journey in August. A careful study of this report suggests that he may have arrived back at San'a about the end of September. There and at Manakha a long and painful delay ensued, while he awaited the arrival of his documents, which had been "echeloned," as he puts it, for safety at various points on his route. In due course he appears to have recovered them all and to have left at last for Europe, where he presented his official report (with the inscriptions) to the Minister for Public Instruction under date of Paris, 21 July 1871. His later and more general account of the journey for the *Société Géographique* purported to "reproduce in substance all the notes collected by me in 1869–70 during my journey in the Yaman." This was clearly Halévy's intention when he embarked on the writing of these articles, which are reasonably full and detailed as regards dates, places, and other matters up to the moment of his arrival in Najran. Why the account was not continued after that (and why there was a gap of four years before the publication of the last instalment) I have never seen explained. Dr. Goitein contents himself with saying that "for various reasons Halévy did not write a book about his journey to Najran," and with mentioning the articles already noted. It can scarcely be doubted that Halévy brought back full notes about his return journey from Najran, in which case they may still be extant somewhere.

In any case the main facts about this journey in so far as Halévy was concerned present no problem; and it should be mentioned in passing that his map of the whole area was an extremely important contribution to the geographical knowledge of his generation. Considering that he had no instruments—apparently not even a compass—it represents a remarkable achievement which, now that a number of points on his route have been exactly located, can be fitted into its true perspective in the map of Arabia to fill a gap which (for the most part) had never before and has never since been visited by any European. On his map Hudaida on the Red Sea coast is shown in its correct position, while at San'a he had already got out of perspective to the tune of 10′ of latitude (too far north) and 38′ of longitude (too far east). The same tendency to exaggerate distances, always in the same directions, re-

mained with him throughout the journey with the following results: Marib 20′ too far north and 37′ too far east; Hazm 36′ too far north and 77′ too far east; Khabb 32′ too far north and 70′ too far east; and Najran (Makhlaf) 64′ too far north and 150′ too far east. The tendency to exaggerate distances in mountainous or difficult country is a familiar phenomenon, while it is worth remarking that in relation to his position for San'a his placing of Marib was astonishingly accurate, erring only by 10′ northward and 1′ westward. Thus, in spite of the regrettable lacuna in Halévy's own account of his journey, his map, his inscriptions, and what we have of his story combine to assure his reputation as an explorer.

So far as I know no one ever questioned it until Edward Glaser, himself a distinguished explorer and epigraphist, went to the Yaman in the '80's of last century. According to Dr. Goitein, basing his statement on a passage in Habshush's preface, "Edward Glaser had seen an open letter to Halévy, published by Habshush and his friends in the Hebrew newspaper *Ha-or* which appeared in Jerusalem." Dr. Goitein has been unable to find any such letter in the newspaper's files of that period, while other manuscripts of Habshush's work apparently suggest that the letter was published not by the newspaper but from a printing-press of the same name. In the absence of any clue to the contents of this "open letter," which appears to be no longer extant, we are left to infer that Habshush demanded some sort of public admission by Halévy that he had been his guide, philosopher, friend, and copyist during the journey. Be that as it may, he would seem to have persuaded Glaser of the justice of his claim; and the latter asked him "to write an account of his journey with Joseph Halévy." According to Dr. Goitein the manuscripts he saw "revealed that the account had been compiled in 1893–4 at the instigation and on behalf of the Austrian Jewish traveller Edward Glaser, who visited Yaman four times and employed Habshush to copy Sabaean inscriptions." The present Chief Rabbi of San'a had apparently "forty-five years ago written the copy intended for Glaser" and was able to provide Dr. Goitein with some missing sheets of the manuscript as well as "some valuable information about the compilation of the book."

What then is the position regarding Habshush? He was a native Jew of San'a, about thirty to thirty-five years old at the time of Halévy's visit, and remained there until his death in 1900. He was a coppersmith with a habit of acquiring Sabaean bronzes for his professional work and an interest in Sabaean letters for their supposed magical significance. He obviously had opportunities of meeting Halévy during the latter's sojourn at San'a, and may well have offered his services to him in his search for inscriptions. For all transactions of this kind we have only Habshush's unconfirmed word as Halévy never mentions him; and he may indeed have procured some inscriptions for him and received payment for them. He was also a man of some intelligence, and was doubtless impressed by a sense of the value and importance of such inscriptions through his contacts with Halévy. His own profession also gave him opportunities of pursuing this side-line of research; and it may be added that such a book as his, full of exceedingly interesting matter, could not have been written without extensive personal acquaintance with the country traversed by Halévy. Dr. Goitein expressly states that "it

contains much additional information gathered in subsequent years, when Habshush revisited many of the places seen by him for the first time while acting as Halévy's guide." His book leaves no doubt in my mind that he did personally visit all the places in question: Jauf, Khabb, Najran, Marib, and the rest. Assuming for argument's sake that he did not actually accompany Halévy, he would have had no difficulty in following his trail from one Jewish community to another. But, if he did accompany Halévy, his book is tantalizingly lacking in the detail we require to fill in the gaps of Halévy's narrative. The very fact that he was "also employed by later travellers in copying inscriptions and collecting old books" may well have been due to his general familiarity with Halévy's activities and a tendency to trade on a closer connection with them than was justified by the actual facts. For instance many an Arab of to-day is prone to exaggerate and trade upon an alleged share in the exploits of Colonel Lawrence. Then, from one source or another, possibly through Glaser, Habshush may well have been able to procure copies of Halévy's published articles to study for a general idea of the details of his route, which were however easy enough to ascertain by local inquiry. And finally we have the admission that, writing his account for Glaser twenty-three years after the event, "he had not previously made any notes about it." In general my feeling is that Habshush's claim cannot be accepted at its face value unless the internal evidence provided by his account of the journey is overwhelmingly satisfactory or, in the alternative, unless Halévy's own account is open to reasonable suspicion.

To take an early episode first: Halévy, after two months on a sick-bed at San'a, says: "However an excursion which, in spite of my weakness, I made to Ghaiman . . ., where I discovered a certain number of inscriptions, gave me ground for hoping that I would find others elsewhere." In all he only got some twenty-four inscriptions of no great length or importance in that locality, about two hundred and eighty-five letters in all, and, after referring to the ancient reputation of Ghaiman, he adds: "At present the place is insignificant; there are few remains of antiquity except the circuit-walls and a portion of the fort." Habshush however is more florid. He "offered to go to Ghaiman, where every stone cries out of the wall: I am two thousand years old." And he managed not only to spend five days over his epigraphic researches but also to work in quite a pretty journalistic story of amusement and adventure. On the whole I find little difficulty in believing that Halévy made a short excursion to Ghaiman to collect these few inscriptions.

On another occasion (p. 45) Habshush finds Halévy copying the inscriptions at Binat 'Ad—incidentally this name quite obviously means "buildings of 'Ad" and not "daughters of 'Ad"—and states that "this was . . . the only occasion upon which Halévy copied inscriptions with his own hands." He emphasizes this by asserting that "during the whole period of his stay in the Jauf, Halévy did not leave the house of his host Salim b. Sa'id except for his visits to Ma'in and Binat 'Ad." In view of Halévy's express references to several visits to both these places this exception must be taken to cover all such visits while excluding visits to any other places in the Jauf area. Against this we have Halévy's own testimony. He tells us that his explorations from Hazm, resumed after his return thither from Najran, occupied two months

in all owing to the necessity of discretion in face of Arab suspicions and hostility. "Other ruins," he notes, "had attracted my attention; I visited about ten of them, but only three produced epigraphic results." He mentions these by name, Hazm itself, Marani, and Fara', and he also notes drawing blank at three places, Siraqa, Maqam, and 'Inaba, saying: "I found only three of the ruins I was told of towards Jabal Laud for want of a guide; and I searched them in vain for inscriptions; I only found a few groups of isolated letters." Of Ma'in he says: "It was there that I copied a good number of inscriptions graven on large slabs . . . except some too high up to be read in the circumstances I was in," *i.e.* among suspicious and hostile Arabs. "To the north-west," he goes on, "my search had better results. . . . I came across one ruin almost as large as Ma'in . . . there I collected many inscriptions or rather fragments." This place was Khirbat al Suda. He then returned to Ghail (from Hazm) to get a guide for further explorations in Lower Jauf. "With much difficulty," he says, "I managed to engage a Jew to accompany me. . . . we went silently towards the north-west . . . and came to a ruin. . . . I stopped to seek inscriptions and found among them one giving the name Kaminahu (Camna). . . . I was impatient to arrive at the other ruin further north. . . . I was able to collect a good number of texts (at Baidha). . . . One sees there an inscription several times repeated, giving the name of a Sabaean noble who restored the wall." Then again, on the return journey, "near Jabal Silyam I got a certain number of fragmentary inscriptions," while in Upper Jauf "I consider myself lucky to have rescued some epigraphic fragments." Baraqish was visited from Ghail on the return journey "in company with a Jew who thought it a pious act to rescue from oblivion the names of Rabbis graven on the tombstones. . . . What a surprise then it was to find not a Jewish village but a Sabaean city, literally covered with inscriptions—the very place I had for some time been seeking as the third city of the Minaeans" (mentioned in the Ma'in texts).

I find it very hard to believe that Halévy did not actually visit any of these places. His all too short account is clearly that of a shrewd and observant eye-witness of the scenes he describes. And I cannot believe that, if in fact he did see these places and their rich store of inscriptions, a man of his scholarly distinction could have resisted the temptation to copy them himself in spite of all circumstantial difficulties. In many cases he expressly says he did copy them and very frankly describes the difficulties with which he had to contend. And in a sojourn of two months he must have had ample opportunities of doing the work unless, as Habshush suggests, he was virtually a prisoner practically all the time and had to depend almost entirely on Habshush's activities. In that case he would seem to stand convicted of a deliberate fraud perpetrated apparently for the sole purpose of getting exclusive credit for the collection of the inscriptions, for, even if all the inscriptions were copied for him by other hands, he would still be entitled as an explorer to all credit for a splendid and daring journey. Both geography and epigraphy profited greatly from that journey; and I cannot think that Halévy would in any way have been discredited in the eyes of the scientific world by an admission that the inscriptions had actually been copied by a guide employed for that purpose. Glaser himself had no compunction in using copyists,

including Habshush, and has not on that account lost any of the credit due to him as an epigraphist and traveller.

What then are we to make of Habshush and his claims? The Jauf episode must be regarded as the vital factor in the controversy now raised over the graves of the two principals in this drama. I have given my reasons for accepting substantially the genuineness of Halévy's account of his activities in that area. They produced no fewer than four hundred and eighty-seven out of his total of six hundred and eighty-six inscriptions, or 71 per cent. The twenty-four inscriptions from Ghaiman must similarly be credited to Halévy himself, while there seems to be no reason for questioning his story of his doings at Sirwah, which produced twenty more, bringing his percentage to seventy-seven. Similar arguments can be adduced in other cases, *e.g.* at Marib. Unless then Halévy was deliberately lying in a dozen or more instances in order to keep all the credit for his expedition and its results entirely to himself, Habshush's claim regarding the copying of the inscriptions must be dismissed as untenable. In support of that claim we have only his uncorroborated word and his very interesting, though rather garrulous, narrative of the alleged journey with Halévy, which provides little internal evidence of any real value in his favour. For instance, assuming that Dr. Goitein's synopsis is really "detailed, although not altogether complete," Habshush, while frequently noting the day of the week or "the following morning" or similar stages of the journey, never gives an actual date during the whole of his account of the proceedings. He does however note that the travellers arrived at Ghail just before the Passover and at Najran on the eve of Pentecost. These are the only datable occasions given by him, and it does not seem unfair to suggest that the Jewish communities of the two places in question would have remembered the coincidence of Halévy's visits with these important festivals. Halévy himself of course gives us the actual dates on which they fell in 1870.

We know that Habshush took no notes on the journey; and his memory seems to have betrayed him regarding the governmental position at San'a at the time of Halévy's visit. The latter tells us that at this time San'a was governed by an independent municipal council under the presidency of a merchant named Muhsin ibn 'Ali, who had been re-elected to the post on several occasions since 1855 by the local bourgeoisie, while the degenerate descendants of the Imams were going about begging their bread among the surrounding tribes or devoting themselves to mystical studies. These were matters of fact, regarding which a scholar like Halévy is unlikely to have been misinformed and which he doubtless recorded in his notes. Habshush on the other hand represents San'a as being at this time governed by Saiyid Muhammad ibn Yahya Hamid-al-Din (apparently the father of the present Imam) on behalf of the then Imam, Muhsin al Shahari, who lived at Bait Zabadan without any real power in a country infested by anarchy. This statement appears not to be supported by such authorities as we have for the history of the Yaman.

Another point which needs to be cleared up is whether Halévy had or had not any permanent companion on his journey. We have seen that he never mentions Habshush at all, while Habshush himself produces a great mass of

evidence suggesting that he was with Halévy from beginning to end. Now Halévy frequently mentions his guides and companions, sometimes by name, on various sections of his journey; and it remains to discuss whether Habshush can fairly be identified with any of them. When Halévy's friends at San'a tried to dissuade him from the venture, "the only thing I asked of them," he says, "was to find me a guide and a baggage-animal for the next stage. . . . At 4 p.m. (15/2/70) my guide arrived with his ass. . . . I begged my friends . . . to let me depart alone so as not to arouse the Arabs." While passing along the city wall they encountered a snake. "*Mon compagnon de voyage*," he records, "killed it with a blow of his stick. The guide regarded this incident as a lucky sign" and began to be cheerful and talkative. Superficially it might seem that the party consisted at this stage of at least three persons; and this is, so far as I can discover, the only passage in Halévy's account on which the supporters of Habshush's claim can rely as evidence that Halévy had a companion on his journey, whom he thus introduced once and for all without even naming him. But a more careful reading of the passage certainly suggests that logically "*Mon compagnon de voyage*" and "*le guide*" may refer to one and the same person. I take this to be the case for hereafter, whenever he uses the word "we," it is consistent with the assumption that it refers to himself and his guide; whenever he speaks of inscriptions and other discoveries he always uses the word "I." At Shira' for instance he wanted to visit the ruins on Jabal Khalil, regarded by the Arabs with superstitious fear. "It was idle to think," he says, "that an Arab guide would conduct me there. But the Jews were less credulous and one of them accompanied me on this excursion without hesitation." Beyond Madid the guide "who accompanied me would not deviate from the track. . . . This annoying circumstance prevented me visiting" the ruins of Quthra and Zaza. "I could not think of going there alone. . . ." From Milh "I tried to get a Jew to go with me but without success and I had to resign myself to be guided by an Arab of Majzar," who later produced one of his relatives "to take me to Jauf." From Ghail "a co-religionary agreed to conduct me to Hazm" and in the afternoon they reached the Kharid river. The Jew was carrying a sack of wheat, which he hid in some bushes as a preliminary to bathing in the stream. Halévy also bathed and then the two tried to catch some fish without much success until some Arab women came to their aid. They then caught about thirty large fish "some of which served to provide a delicious dinner." What they did with the rest is not stated in Halévy's geographical account, while his official report raises a slight difficulty in providing a solution of the problem of the surplus fish. "The dinner," he says, "was cheerful and, as *mes compagnons de voyage* wanted to carry away some fish to their homes, I had to spend the night by the river. At dawn we continued our march." I can only explain this by assuming that, in addition to the Jewish guide, a number of other Jews of Ghail had accompanied Halévy as far as the river to get some fish for their families. Habshush tells us that he had stayed behind at Ghail for the Passover, for which presumably the fish was needed, and we can take it that on this occasion he was not with Halévy. He claims to have rejoined him later at Jauf, in which case it is difficult to understand the passage in Halévy's account in which he recognizes in his Jewish host,

Salim ibn Sa'id, an uncommon measure of intelligence suggesting that "such a man was precisely what I needed for the carrying out of excursions without arousing the suspicions of the Arabs." Habshush would obviously have served that purpose equally well.

A careful reading of the rest of Halévy's story affords no support whatever for Habshush's claim, and I do not propose to analyse its details any further. I cannot on the evidence available bring myself to believe that Halévy had any full-time companion on his journey. If that is so Habshush stands convicted of imposture; but we have to explain the fact that he appears to have convinced Glaser, who was no fool and, so far as we know, had no motive for discrediting Halévy. The reason appears to me fairly obvious. Habshush could produce in favour of it a virtually complete set of copies, made by himself, of the inscriptions which Halévy copied and brought to Europe. In the intervening twenty-three years he had had ample opportunities of visiting all the sites discovered by Halévy—it is indeed admitted that he did so—and of copying their records. He had admittedly been inspired with an interest in such things by Halévy, and may well have been told by him of the inscriptions which he had been unable to see or copy, *e.g.* at Na'it, Khabb, and Sirwah. He may also have been promised payment for any records copied by him in the course of his travels. It is not even improbable that he may have actually copied some of Halévy's inscriptions and received payment for them. It also occurs to me as possible that Halévy may, on his return to San'a, have employed Habshush to travel back on his route to recover his "echeloned" copies. This is certainly consistent with his complaint, quoted by Dr. Goitein from his 'Études Sabéennes' (p. 237), regarding some "*textes . . . qui m'ont été soustraits par mon guide de San'a.*" Glaser however condemns Halévy for making "Habshush's copies his own without mentioning his name," while Dr. Goitein is prepared to condone this rather strange behaviour and quotes Habshush as saying that "Halévy always transcribed copies immediately after they had been brought to him." But why, if not for the purpose of staging a fraud? Anyway this disposes of any possibility of the matter being put to the test by hand-writing experts.

There is of course no doubt that Halévy made this journey, and that he was therefore the first European to visit Jauf, Khabb, Najran, and Habauna: the last-named on a rapid excursion. But it is worth while placing on record the fact that all the village names in the last two valleys recorded on his map, twenty-four in Najran and thirteen in Habauna, are easily identifiable to this day. Habshush studiously avoids all place-names and gives quite a fanciful account of the extent of Najran and the density of its palm-groves. In all probability he did visit Najran, but he was not interested in geographical detail. He misnames Badr, the seat of the Makrami sect, as Barad; and Dr. Goitein quite wrongly assumes that the latter must be the correct form. Then Halévy's map makes it quite clear that, on leaving Najran, he travelled south *via* Nahuqa and Amlah, while Habshush, in so far as we can follow him at all, suggests a more westerly route up the Najran valley *via* the defile of Hadida, which I can only identify with the Jalad strait or the Madhiq gorge above it. His objective was Kataf, which I cannot identify, but which may be on the Najran-Sa'da track in Wadi Marwan, as the upper reach of Wadi

Najran is called. Habshush certainly says that his Jewish host there had migrated to Wadi Najran from San'a, from which I infer that his village lay in the upper reaches of Wadi Najran. Thus, on leaving Najran, Habshush appears to have followed a different route from Halévy's, though he veered back to the latter's route at Mahtawiya near Suq 'Anan in the Barat district after leaving Kataf. Dr. Goitein notes that Halévy does not mention either Mahtawiya or Suq 'Anan, but they are in fact both quite clearly shown in the Barat district on Halévy's map. His route passed through them both, while Habshush did not apparently visit the second, another suggestive discrepancy between the two accounts. Habshush represents himself, quite correctly no doubt, as passing through Wa'ila territory on leaving Kataf, but he does not mention the important oasis of Amlah, where Halévy stayed.

Such then is the available evidence on which we have to judge the claim of Habshush to have been Halévy's companion on his journey of 1870. It is very unsatisfactory that the former's story has to be judged on a mere synopsis, however "detailed," of his book, which was written partly in Hebrew and partly in San'ani Arabic in Hebrew characters. The story itself, though garrulous, loosely composed, and lacking in scholarly exactitude, is of considerable interest as a record of the author's own journey or journeys in country already covered by a more observant traveller, who had evidently inspired him with zeal for profitable exploration. A full English translation of his work would therefore be a welcome addition to the literature of travel, as also would be a translation of the Chief Rabbi's note to Dr. Goitein about the circumstances in which the book was compiled. Still more valuable would be the discovery and publication of Halévy's own travel diaries, particularly those covering the period of his sojourn at Najran and his return journey. Until this further material is made available for study my conclusion from the evidence before us is that, while Habshush certainly travelled, perhaps more than once, over most of the ground covered by Halévy, and copied inscriptions in the same and other localities, he did not do so in Halévy's company. An adventure like Halévy's must have given rise to many legends in the land of Sheba, and Habshush has done no more than work them up into a very readable story with plenty of the local colour with which he was himself perfectly familiar.

The author's spelling has not been adjusted to the spelling of the P.C.G.N.

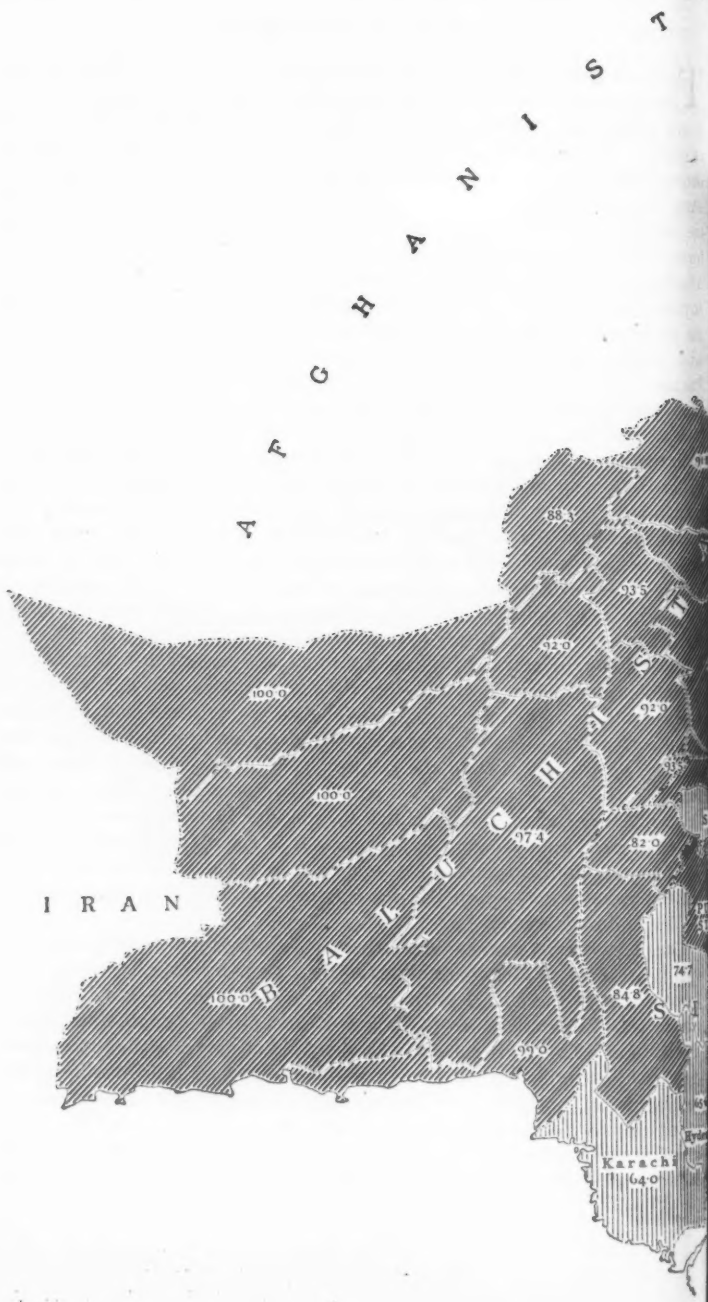
GEOGRAPHICAL ASPECTS OF THE PAKISTAN SCHEME

CAPTAIN O. H. K. SPATE

THE emergence, within the last three or four years, of the Pakistan issue has given an entirely new emphasis to the Indian communal problem. It is not indeed easy to define precisely what is meant by Pakistan, the more so as neither the proponents nor the critics of the scheme show any eagerness to define their terms. A broad distinction may be drawn between the use of the word as a political slogan, and its use to designate a definite area involved in the attainment of the slogan's aim; both usages are current in India. In the former sense, it is equivalent to a demand for self-determination for Indian Muslims which (according to the individual speaker or writer) may mean anything from cultural autonomy to complete secession from India; though the more extreme interpretation appears to be more representative of those who would style themselves Pakistanists. Strictly speaking, the word Pakistan is not the name of any particular historical or territorial entity, but is a made-up term meaning "the Land of the Paks," that is, roughly, of the Pure or Faithful. But it is frequently loosely used to cover all those areas in India with a Muslim majority for which the right of self-determination is claimed. It is better however to restrict the word Pakistan to the more fundamental part of the claim, that is, the four provinces of the Punjab, Sind, Baluchistan, and the North-West Frontier Province, since the other main unit in the scheme, Bengal with all or part of Assam, is often referred to by its advocates as Bangistan. The more dubious demand for Usmanistan or the Nizam's Dominions, which is not based on the possession of a Muslim majority, is so vague as hardly to need detailed consideration.

Since the arguments for Pakistan are to a large extent avowedly based on geographical considerations, and since the campaign, if successful, would add a new entity to the political geography of Asia, a brief examination of these arguments may not be out of place in a geographical journal. This review will not be concerned with the political controversy as such. Where the balance of subjective argument on points of culture and ideology is so nice an outside observer may well feel that the question becomes to a large extent one of political and economic expediency. It is the object of this article to put forward, from this somewhat empirical viewpoint, a sketch, as concise and objective as may be, of the demographic and economic background to the demand for Pakistan.

The idea was first mooted, in a rather vague form, by the late Sir Mohammed Iqbal in 1930. Only within the last three years however has the demand become part of the official programme of the All-India Muslim League, in part at least as a reaction to the policy of some of the Congress ministries. The League's Lahore Resolution (April 1940) laid down as the "basic principle" without which no settlement would be acceptable to Muslims "that geographically contiguous units are demarcated into regions which should be so constituted with such territorial adjustments as may be necessary that the areas in which Muslims are numerically in a majority, as in the North-Western and Eastern Zones of India, should be grouped to constitute inde-


AFGHANISTAN
IRAN
BALUCHISTAN
88·3
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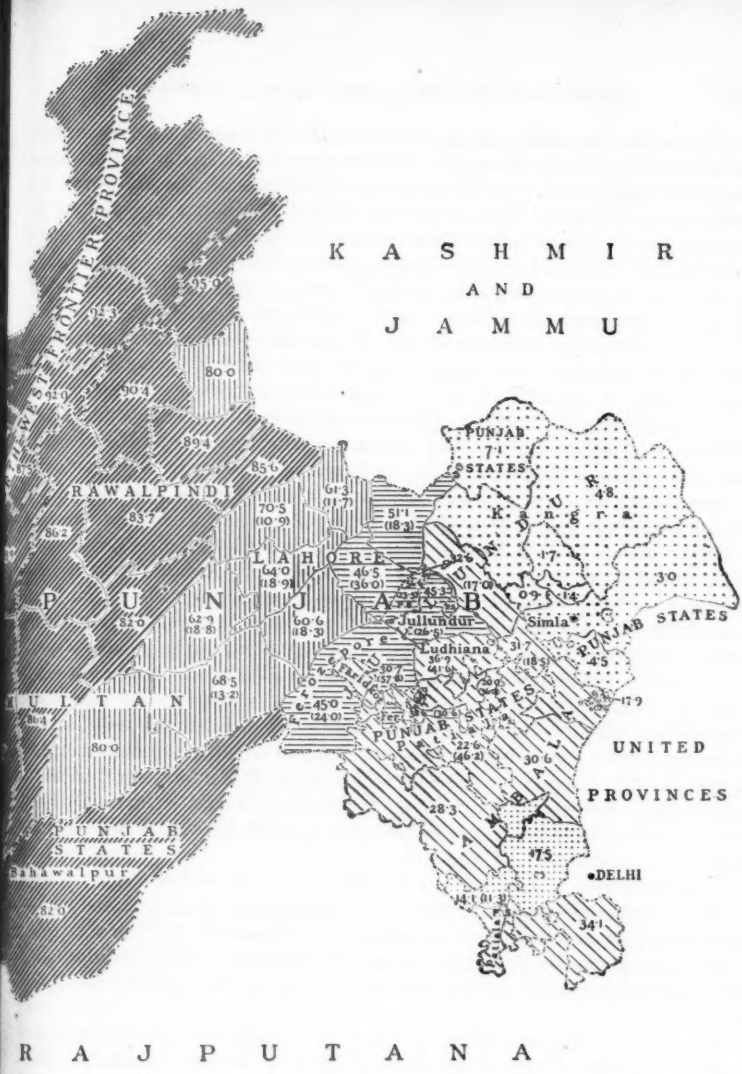
99·0
100·0
Karachi
64·0



Percentage of Muslims by districts

- >80 %
- 60-80
- 40-60
- 20-40
- 10-20
- <10 %

Where over 10% of total, the percentage of Sikhs is shown in brackets

Scale of Miles

50 0 50 100

District boundaries

Fig. 1. Pakistan

pendent states in which the constituent units shall be autonomous and sovereign." As at first interpreted this not entirely lucid resolution did not altogether negative a Central Government "with minimum powers" in which autonomous Hindu and Muslim spheres should "collaborate as equal" [1]; a *Staatenbund* as opposed to the *Bundesstaat* which was the most to be hoped for from the Congress Raj. The Madras session of the League (April 1941) to some extent tightened up the demand, and to judge from authoritative current pronouncements nothing less than complete secession is aimed at. Mr. Jinnah at least appears to ignore the suggestion of territorial adjustments and (while refraining from committing himself to any particular map) possibly even to envisage a Punjab–Bengal corridor. It is impossible to be sure how much, if at all, this *non possumus* attitude may represent merely a determination to keep the League's bargaining power intact; the 1943 Delhi conference threw no further light on this aspect of the matter.

As suggested above, the programme includes three demands of diminishing intensity which cover the following areas: (i) The north-western provinces of Punjab, Sind, N.-W.F.P., and Baluchistan, or Pakistan proper, which is fundamental [2]; (ii) Bangistan, or Bengal (possibly with Assam), which does not appear to be so seriously pressed; and (iii) a somewhat shadowy claim to Usmanistan, *i.e.* the Nizam's Dominions. This last point need not long detain us; Hyderabad is of course predominantly Hindu in population (see p. 133) with a Muslim ruler, and the claim here, so far as it is pressed at all, avowedly abandons self-determination and is based simply on the right of conquest and treaty.[3] Obviously this is destructive of Pakistan's own claim to independence. Usmanistan is thus of little or no practical importance, though Sir Chamanlal Setalvad has suggested, with humour not perhaps entirely untouched by malice, that an "adjustment" might be made by an exchange of thrones between the Nizam and the Hindu Maharajah of Muslim Kashmir.

Of the numerous arguments for and against the Two Nations theory, two only need concern us here: the claim that geographical factors combine with those of religion and custom to differentiate the Muslim areas from the rest of India so completely that none but an administrative unity, crushing all local interests, is possible; and secondly the argument drawn from historical geography.

With regard to the first, and more fundamental, contention, a reasoned and temperate exposition may be found in 'Pakistan a Nation' (1940), by "El Hamza," which has a very strong bias towards geographical determinism. The series of distribution maps which El Hamza presents certainly emphasizes the strong geographical differentiation of Pakistan; particularly suggestive are those showing the distribution of wheat, camels, and canal irrigation, while the area served by the port of Karachi and the North-Western Railway is almost exactly coincident with that of Pakistan, an integration hardly to be paralleled elsewhere in India. The greater the weight we attach to these

[1] 'Indian Year Book, 1941–2,' p. 914.

[2] Pakistan as used below is invariably confined to this restricted sense.

[3] Chaudry Rahmat Ali writing on "The Full Fundament" in 'Pakistan,' a symposium representing all points of view (edited K. M. Ashraf, Delhi, 1940).

geographical factors however the more difficult does it become to accept the racial and ideological aspects of the Two Nations theory. The argument is that geographical influences have produced in Pakistan a nearly homogeneous nation which is culturally sharply severed from Hindustan, the severance being completed by waves of invaders from the north-west who have brought with them a religious outlook, completely incompatible with that of the Hindus, with whom the newcomers have not intermixed to any great extent. Leaving aside the fact that a large proportion of the Muslim community is descended from converts from the lower Hindu castes, it is clear that the geographical factors which foster the individuality of the north-western Muslims cannot possibly account for the (numerically larger) Muslim community in Bengal, an area which in fact reproduces in a higher degree precisely those features of the environment of Hindustan which are alleged to be responsible for the Hindu outlook. It is futile to base an argument for Muslim self-determination on a map of the wheat-eating areas of the north-west when the Bengali Muslim eats rice. Again, the geographical unity of Kashmir and of the Punjab plains is obvious only to the eye of faith.

The argument drawn from historical geography simply points to the fact that in the past India has rarely been politically united. The unstated inference that this fact supports a north–south division of the Indo-Gangetic plain however by no means follows. An examination of what may be called the average boundaries of some eighteen major political distributions from Asoka to Aurangzeb (third century B.C. to latter part of seventeenth century A.D.) suggests, as might be expected from general physiographical considerations, that the fundamental division is an east–west one, marking off the Deccan from the Indo-Gangetic plain. After the Himalaya themselves by far the most recurrent frontier zone is along the Narbada and eastwards across the forested Chota Nagpur plateau to the sea south of the Ganges delta. As for the division of the Indo-Gangetic plain itself, El Hamza cites Professor Lyde's assertion that the Jumna has "*constantly* been a political frontier, *e.g.* for Kanishka's Empire (A.D. 350), for the Empire of the White Huns (A.D. *c.* 500), etc." (my italics). It is with diffidence that one dissents from Professor Lyde; but (apart from the suggestive "etc.") these citations after all cover a relatively small part of India's history; the deep-seated structure-lines of political and cultural geography do change, or there would be no historical geography.[1] The approximate frontier between Greco-Persian and Indian states before the Mauryas (321–184 B.C.) was along the Hydaspes (Jhelum); and the influence of the Guptas (A.D. 320–480) also extended up to this river. It is unlikely that these early boundaries were linear; a zone of gradually lessening control is more probable. But the later Muslim states have surely far more relevance to the matter in hand; and here, even after the earlier Slave and Tughlak Empires had broken up, almost the only river which was *not* often used as a boundary was the Jumna. Alike the depleted dominions of the Lodis (A.D. 1451–1526) and the great Empire of the Moghuls were *centred* on the Jumna in the Delhi–Agra region, and it is significant that

[1] Citations for an opposite view might also be extracted from Professor Lyde; *e.g.* "Asoka, the Afghans, the Moghuls, had all found Hindustan more or less a unit" ('Continent of Asia,' 1933 ed., p. 264; and *cf.* pp. 392–3).

in the worst days of the Delhi Kingdom, before and after the greater Moghuls, its boundaries were generally on the Ganges and the Sutlej. It is probably however true that Delhi owes much of its importance not only to its nodality but also to its position in the transition zone between two differing economies. The southern part of the Delhi Doab is indeed a critical area; and the natural boundary between the Punjab and Hindustan (in the restricted sense) appears to run from the district round the Sutlej-Beas confluence obliquely across the Doab towards the lower Jumna around Agra, where a third natural region, Rajputana, marches with the other two in the last spurs of the Aravallis. As will be seen later, the present communal boundary lies in this same zone well to the west of the Jumna.

The real basis of the self-determination claim is simply communal. The total population (1941) of Pakistan, including the minor Indian States but excluding Kashmir and the frontier agencies, is some 42,787,000. Of these only 25,064,000 or 58·6 per cent. are Muslims, the principal minorities being about twelve million Hindus and five and a quarter million Sikhs. Inclusion of the areas mentioned above raises the Muslim percentage to no more than 60·7. However as over ten million of the Hindus and nearly all the Sikhs are in the Punjab, the minority problem in Pakistan is more localized than the bare figures suggest; the map of Muslim district percentages (Fig. 1) shows that there are relatively very few districts where the communities are at all evenly balanced. Of the twenty-eight districts of the Punjab, eighteen have an absolute and three a relative Muslim majority; of the seven districts with Hindu majorities (four absolute and three relative) five were in the eastern (Ambala) division, and one of the others is the sparsely populated hill district of Kangra. In Jullundur and Lahore divisions the Sikhs introduce a third element, attaining a relative majority in Ludhiana district.

It will be clear from Fig. 1 that the communal boundary lies considerably to the west of the Jumna, and that were Pakistan to achieve independence a rectification of frontiers by detaching Ambala Division would be desirable. Such a Zonal scheme was included in Sir Mohammed Iqbal's original suggestion and was also mooted by the late Sir Sikandar Hyat Khan. The position has since hardened; the League, or at all events Mr. Jinnah, seems committed to the position that "self-determination" means a bare majority of the Muslim population only in all *Provinces* where they have a majority. In Ambala and Jullundur Divisions this would nowhere represent more than 23 per cent. of the total population; and even a two-thirds majority of the Muslims would amount to 30 per cent. of all inhabitants in two districts only, Jullundur and Ferozepore.

The Sikhs present a difficult problem under any dispensation. Though they are nearly all to be found in two divisions (Lahore and Jullundur), they hold even a relative majority in only one small district; they have also an absolute majority in the small state of Faridkot and a relative one in Patiala, the largest (in population) and most important of the Punjab States. The idea of a Khalsistan, perhaps as an autonomous unit within Pakistan, has been suggested, but is clearly impracticable; while the blandishment that the Sikhs would be lost in Hindustan but would form a fine 14 per cent. minority in Pakistan seems to have met with small response.

In Sind the percentage of Muslims varies from over 90 in the west to only 47·5 in Thar Parkar district north of the Rann of Cutch; however this is a thinly populated area and there are obvious objections to detaching it from the province. Sind was a part of Bombay Presidency until 1936, but its geographical and historical connections are with the Punjab; it is largely a matter of accident that it was administered from Bombay.

It may be noted that the Muslim strength in Sind has fallen from 76 per

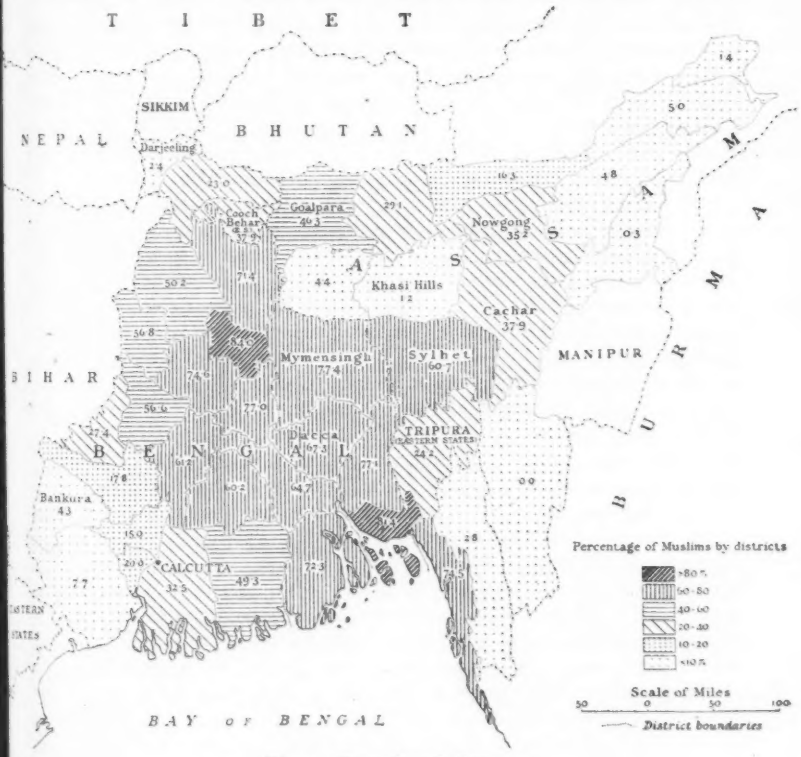


Fig. 2. Bengal and Assam

cent. in 1901 to 71 per cent. in 1941. There appears to be some internal migration of Hindus from Sukkur and the districts on the right bank of the Indus to Karachi; while irrigation development in Hyderabad district "has attracted a more than equal number" of Muslim immigrants. Nevertheless the Hindu increase in right-bank districts between 1931 and 1941 amounted to 14 per cent. while that of the Muslims on the left bank was only 10 per cent. The conclusion appears to be that more Hindus are coming from the east and south than Muslims from the west and north.[1]

[1] 1941 Census, Sind Tables, p. 26.

In Bangistan a rectification of frontiers would also seem a necessary preliminary to self-determination. In 1941 Muslims were 33,378,000 out of a total population of 62,452,000 in Bengal; in Assam 3,474,000 out of 10,930,000. Detailed figures show Muslim majorities varying from 50·2 per cent. up to 84·0 per cent. in sixteen (generally eastern) districts of Bengal while in the remaining twelve their percentage dropped as low as 2·4 and 4·3 in Darjeeling and Bankura respectively (Fig. 2). In Assam there is a Muslim majority of 60·7 per cent. in Sylhet district and a strong minority in Cachar (37·9 per cent.). These areas lie in the Surma valley adjoining the overcrowded Bengal districts of Mymensingh and Dacca, emigration from which has been a notable feature of the last few decades. The population involved has been mainly Muslim, and it has been a "family migration" of squatters in contrast to other internal movements which are largely comprised of wage-earners whose families remain behind.[1] North of the Khasi Hills Goalpara and Nowgong districts have 46·3 and 35·2 per cent. Muslims respectively.

A division of East Bengal plus the Surma valley would thus be indicated on communal grounds; and although "partition" has a bad ring since Curzon's failure a division under purely Indian auspices might be a different story: certainly the Congress scheme for territorial reorganization of India along primarily linguistic lines pays no attention to the present (often arbitrary) provincial boundaries, though it does not provide for any rearrangement in the present case. However even more than is the case with Pakistan itself, the viability of Bengal cannot be judged on merely numerical grounds.

There remains the larger question of the extent to which the creation of Pakistan would in fact represent self-determination for the Muslims. In 1941 there was a total of 94,390,000 Muslims in All-India. Neglecting possible rectifications of boundaries, and including Kashmir and the Punjab States in Pakistan, some 28,393,000 of these, or 30·1 per cent. of the total, would be included in Pakistan and 33,378,000 (35·4 per cent.) in Bengal; the remainder, a full third of the total, would continue a scattered minority in Hindustan. Moreover the two Muslim States would contain minorities of 40 per cent. in Pakistan and 46 per cent. in Bengal—minorities too large for successful assimilation, especially when we consider that they contain on the whole a larger proportion of the richer, more literate, and more consciously influential classes. Rectification of frontiers to exclude as many as possible of these heterogeneous elements will of course merely increase the number of "unredeemed" Muslims to about half the total. The circle is complete: in either case it seems scarcely possible that irredentist movements from one side or the other—or both—would not develop. This mere fact of its incompleteness is in itself probably the strongest argument against the Pakistan idea, coupled with the encouragement its achievement would give to other fissiparous tendencies (see p. 133).

It can, it is true, be argued that minorities on both sides of the line offer guarantees, or rather hostages, for the good behaviour of the majorities. Dr. Ambedkar thinks this, with probable justice, "a dreadful plan" and suggests transfer of populations as the only way out of the circle.[2] Neglecting the

[1] 1931 Census, Report, pp. 65–6.

[2] B. R. Ambedkar, 'Thoughts on Pakistan' (Bombay, 1940), Ch. VI *passim*.

absence of numerical equivalence (all the greater if his rearrangement of boundaries be accepted), there are grave difficulties involved because the populations to be exchanged are by no means of equal economic status. As a general rule it is the intrusive community which is the more urbanized,

	Pakistan	*Bengal*	*Rest*	*Totals*	*Kashmir*	*Hyderabad*
Total ..	46 809	62 452	277 405	386 666	4 022	16 339
Muslim ..	28 393	33 378	32 619	94 390	3 074	2 097
% Muslim	60·7	53·4	11·8	24·4	76·4	12·8
	30·1%	35·4%	34·6% of the total Muslims in India.			

Pakistan includes Kashmir and Sind; Rest of India includes Hyderabad and other States; Bengal includes Indian States.
Figures for Kashmir and Hyderabad thus occur twice in the table.

Populations (in thousands) and percentages

i.e. Hindus in the North-West, Muslims elsewhere except in Bengal and (for special reasons already mentioned) Assam. Thus in 1931 the number of Hindus per thousand living in towns was 806 and 651 in Baluchistan and N.-W.F.P., only 99 and 79 in Central and United Provinces respectively. The corresponding Muslim ratios were 107 and 115, 452 and 289.[1] But while the *cadre* of Muslim traders and professional men in the great cities of the United Provinces might be replaced, the sudden disappearance of the fewer but very important Hindu business men from the north-west would involve serious economic readjustments. Even if it were only a matter of finding land and capital for exchanged peasantries, it must be remembered that the two groups would be accustomed to very different agricultural regimes; and it would also be extremely difficult to find estates to compensate the numerous class of Muslim Zamindars in the United Provinces. Nevertheless, given Pakistan, the difficult problem of a transfer might have to be faced.

Much Indian criticism of the Pakistan scheme is based on economic and financial grounds. There are really two aspects of the problem: one whether Pakistan is economically possible at all; the second whether admitted economic losses may not be over-balanced by political gains. The answer to this second question cannot, of course, be other than subjective.

On the first point, comparison of Pakistan with other countries of south-west Asia suggests that as an economic entity it would hardly be so feeble as to be kept alive only by the injection of international loans. Indeed, the economic interests of the north-west do differ very considerably from those of the rest of India in some respects, much in the way that those of West Australia diverge from those of the Commonwealth as a whole. An even closer analogy might be drawn with the South before the American Civil War. Pakistan is essentially a primary producer with major markets for its cotton and wheat beyond its frontiers; such industrialization as exists is largely confined to a few textile mills and the simple making-up of food products. Nor, except for its not too convenient water-power, has it any considerable industrial resources; salt and a little oil are almost the only minerals. It is therefore very doubtful whether its interests are best served by the high protectionism

[1] 1931 Census, Report, p. 61.

to which the more active commercial and industrial circles of India are apparently wedded, though doubtless an independent Pakistan might well find it desirable to come to a liberal tariff understanding with its richer neighbour.

Fiscally, the Punjab is the only Pakistan Province which is self-supporting; its financial strength is mainly due to irrigation revenue. N.-W.F.P. and Baluchistan, being essentially military provinces, are unable to pay for their own administration. As for Sind, the Committee which examined the fiscal aspects of its separation from Bombay estimated the initial deficit at nearly 100 lakhs of rupees, without allowing anything for the enhanced overheads of a separate establishment. It came to the conclusion that "there is thus no question of Sind being able to stand surety for the Lloyd Barrage, the problem is whether the Barrage can stand surety for Sind."[1] Later inquiries scaled the initial deficit down to some 80 lakhs, but were compelled to admit that even when the Barrage would have reached its maximum returns a smaller but still considerable deficit would remain. At present Sind receives from the Centre an annual subvention of 105 lakhs, to diminish progressively from 1946. The realization that the Punjab, the least purely Muslim of the four, is most unlikely to be able or indeed willing to carry on with assistance on this scale has probably contributed to a certain lukewarmness towards the Pakistan idea observable from the outlying Provinces.

The Pakistanist's answer is threefold. In the first place it is claimed that the Karachi Customs (which are Central revenue) would alone give Sind a large surplus. However it hardly follows that those receipts would be maintained at their present level in an independent Pakistan, since it is impossible without long inquiry to forecast the result of the secular tug-of-war between the natural low-tariff tendency of an exporting primary producer, and the revenue tariff psychology which is traditional in India. Secondly, it is argued that much of the financial burden is due to Defence expenditure, which is itself demanded by an All-India policy and would be unnecessary for a Muslim State on friendly terms or even allied or federated with its western neighbours. The argument is double-edged, since, leaving aside the larger questions of policy, the major portion of the Army's wages bill (in peace at all events) undoubtedly goes to the Punjab; and if the proportion of Army contracts which goes elsewhere is higher, the return in food and clothing to Punjab is a not inconsiderable item in their welfare.

Finally, on the general question it is possible to accept the position that Pakistan would be economically viable on a lower plane than that possible to Hindustan, and that smaller revenues and a reduction in the pace of social progress are simply the price of independence. To the out-and-out Pakistanist, subventions from the central government are little better than disguised loans from a foreign (*i.e.* Hindu) imperialism, which are better done without. One may feel that this attitude is socially retrograde, but it is a subjective answer which cannot be gainsaid by an outsider.

Bangistan, with or without Pakistan, is a quite different case. Relatively highly industrialized as Bengal is, it is very difficult to envisage for it any successful economic life were it to be cut off from the Ganges hinterland. As it is, Bengal is a deficit province only kept on its feet fiscally by the return

[1] Report of Sind Financial Enquiry Committee, 1931, p. 29.

to it of the provincial share of the Jute Export Duty—which obviously is the major portion of the sums raised by this duty, and amounted in 1938–9 to over 17 per cent. of the Bengal revenues. Clearly reliance on a single source of income is highly dangerous: there are other tropical deltas which might turn to jute. The provincial sources, of which Land Revenue is the chief, are not naturally susceptible of great expansion.

The question of Calcutta is also difficult. If partition left this metropolis out of Bangistan, the economic situation of the remnant state would not be enviable—a small territory suffering from severe agrarian overcrowding, cut off from the sources of power and raw materials on which Bengal's industries have flourished, and by the very communal hypothesis to which it owed its existence unable to seek relief in emigration. Were Calcutta included within Bangistan similar problems would remain, perhaps intensified. Apart from the dislocation of Calcutta's entrepôt functions, much of its prosperity is dependent directly on the coal and metals of Bihar. The hinterland would suffer also, and a study of the map suggests that visions of Vizagapatam with its poor communications and poorer hinterland becoming Hindustan's Gdynia are merely taking the will for the deed.[1]

Before leaving Bangistan we may notice the significant distribution of urbanism and literacy between the two communities, as shown by the 1931 Census: [2]

	Rural (thousands)	*Urban (thousands)*	*Per cent. Urban*	*Literacy in Bengal (per thousand)*	*Literacy in India as a whole*
Hindu ..	19 029	2 541	13·3	180	83
Moslem ..	26 468	1 029	3·5	85	44

The figures tell their own story of the generally higher educational and social status of the Hindus in Bengal, and suggest that in practice and over a long term the Muslim nature of Bangistan polity might turn out to be more nominal than real. Pakistan may be held an open question, but there can be few who really believe in the practicability of Bangistan.

A minor point, which might arise were Pakistan (with or without Bangistan) to be attained, concerns the capital of India. Even with the Punjab boundary shifted well west of the Jumna, Delhi would perhaps be felt to be rather too exposed as the capital of Hindustan, and would have lost many of its nodal advantages with the loss of the territory to the west. Historically its associations are overwhelmingly Muslim. The Presidency cities are all markedly eccentric; Madras would hardly be in the running, but between Bombay and Calcutta there might arise a rivalry recalling that of Sydney and Melbourne; the solution might have to be sought in the creation of a humbler Canberra in the Federal Territory of Wardha—which is at least central enough.

The few conclusions which can be drawn from the above review, incomplete as it is, are very tentative. While the excision of even one minority problem from the world would be an unmixed blessing it is generally agreed

[1] The suggestion is made by H. C. Mukerji, "Financial and Military Implications of Pakistan," *Modern Review* (Calcutta), March 1941, pp. 311–12.

[2] 1931 Census, Report, pp. 422–3 and 330.

that fewer state units and less rather than more nationalism are needed to-day. The international position of Pakistan is an interesting subject for speculation: some Hindus fear and some Muslims hope that Pakistan might play a part in a great Muslim federation covering all south-west Asia. Pan-Islamic solidarity is a very real sentiment, but it is a long way from sentiment to a strong political structure. The possibility may be remote, but such a creation would present Hindustan with new defence problems. This is a factor in Hindu opposition to the project; on the other hand some may think with Dr. Ambedkar, who remarks cryptically, if truly, that "a safe army is better than a safe frontier." In essence however the problem is internal rather than international. Were Pakistan a complete solution of the communal problem, it would doubtless be worth while, whatever the price in social progress and historic sentiment; economically it is at least a not impossible proposition. But it is a question whether Pakistan would not in fact create more problems than it solved. It is in the nature of such human problems that they can be solved only by costly experiment; and even then there is no conclusive disproof of the "might have beens" of history.

A STUDY OF LOVEDU SOCIETY

THE REALM OF A RAIN-QUEEN: a study of the pattern of Lovedu Society. By E. JENSEN KRIGE and J. D. KRIGE. (Int. Inst. of African Languages.) *Oxford: University Press*, 1943. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* xvi+336 *pages; illustrations and maps.* 21*s*

THIS important work embodies the results of an investigation into the everyday life, culture, and religion of the Lovedu, perhaps the least known of all South African tribes. In a remarkable foreword Field-Marshal Smuts recommends the book "as one of the most honest and penetrating researches into Native life" that he has come across and gives yet another proof of the versatility of his genius by an expert and inspiring analysis of it, after which any review must sound jejune and dull.

The authors, Mr. J. D. Krige, a nephew of the Field-Marshal, and his wife, Dr. Krige, stayed for a considerable time at the headquarters of the queen and were able by the exercise of great tact and persistence, helped by luck (in that one of the Field-Marshal's daughters had by a fortunate chance already become acquainted with her), to penetrate into the core of the tribal beliefs. A working knowledge of the difficult language was acquired and some twenty months in all were spent, with intervals, in the investigations, chiefly between 1936 and 1938, when the authors held a Fellowship of the International Institute of African Languages and Cultures.

The Lovedu are a Bantu tribe living in the north-eastern Transvaal, insignificant in numbers—some thirty-three thousand—but with a reputation which has spread far and wide over the whole of South Africa as "the people of Mujaji," the great magician and queen of the rain, of locusts, and of drought. The royal ancestors were descended from a son of the celebrated Monomatapa and journeyed down from the region of Great Zimbabwe until they settled in their present home about the end of the sixteenth century. There they mixed

with strains from the Sotho of the central plateau, the Nguni of the south-east coastal regions, and the Shona to the north of the Limpopo, and gradually developed a singularly coherent culture, supporting, and in turn supported by, the mysterious Rain-Queen, the first of whom succeeded the long line of kings about the beginning of the nineteenth century.

Her fame, which arose chiefly from her mystic powers of transforming the clouds into rain, was increased by the ceremonial which surrounded her and by her inaccessibility to all save a few of her subjects, while among Europeans it was at least partly due to her white skin. Certainly Mujaji II, who died in 1894, was fair and was considered by some to have been a woman of mixed white extraction from West Africa. She was the original of Rider Haggard's "She who must be obeyed."

The real Lovedu, or the royal kinsfolk, make only about 10 per cent. of the tribe and the remainder consists of unrelated sections, called after a totem, chief, dynasty, or place, but all are now so interlinked that they form a very compact and interrelated ethnic group.

The people devote most of their time to agriculture, in which mealies are of first importance, followed by eleusine, the oldest grain, which is given to the gods, and then by Kaffir corn and millet, on which greater reliance can be placed in time of drought. These cereals are planted by both men and women, while the latter alone cultivate Njugo beans and pea-nuts which succeed when the cereals fail.

On the whole the crops furnish a well-balanced diet, though this is being upset by the impossibility of further shifting cultivation owing to want of land and the introduction of new practices such as ploughing, which tends to put a stop to farming by women. The people however have a remarkable adaptability and do not necessarily assign a failure of crops to magic or ill-will on the part of enemies. Diseases, pests, and destructive insects are regarded as perfectly natural results of untimely planting or unseasonal rain, though, when there is a great drought, the calamity is held to be a punishment sent by the gods who "hold the arms of the queen" or to displeasure in her heart.

Hoeing is now beginning to be left to the women, while men devote themselves to ploughing, which is not an unmixed blessing as it inclines to break down the contour-terracing and thus accelerate erosion, hinders the rotation of crops, emphasizes the economic as against the purely social value of cattle, eliminates milk from the diet of adults, militates against the husbandry of food resources, and has increased idleness and beer-drinking among the men.

Though cattle have an immense prominence in the social organization, there are few tabus concerning them or magical practices for increasing their fertility. Goats are of great ritual and ceremonial importance; they are largely used in marriage exchanges and in re-establishing strained relations and are often dedicated to the gods and killed at funerals or in welcoming important guests.

Vegetation is of almost unique interest. A considerable body of knowledge has been accumulated as to the uses to which the many kinds of woods, of fruits, and of the flora can be put. The average individual is far better equipped in what almost might be termed scientific knowledge of these than the ordinary white man, and the classification of the flora is fairly detailed; though not of course on our genetic principles. Comparatively few plants are employed from the purely magical point of view; the natives are generally severely practical.

Mutual helpfulness in working, especially in agricultural and building activities, and in exchanging the products of their labour, is greatly practised.

Anyone may join in a *lejema*, or working group, though usually relatives and neighbours predominate. All work proceeds in a leisurely manner; there is no rivalry, efficiency or inefficiency is not remarked, and there is practically no leadership; yet the whole *lejema* cooperates effectively and the affair generally ends as a pleasant social event in beer-drinking.

Strangely enough, the new economy and competition introduced by the European have been accompanied by an extension of magic and sorcery in order to secure a better position and success in the general rivalry; for personal profit, not sociability, is the prime motive and room for mutual reciprocity is narrowed.

In the same way the new idea of "biznis," or business, which involves money transactions and is conducted for personal gain is greatly deplored and looked down upon. Commerce was of little consequence. Land cannot be sold, and cattle are absorbed in the bride-price exchanges. The volume of internal trade, except for gift-exchange, is insignificant.

The village is usually composed of a group of natives, chiefly on the father's side, sometimes including a few people from the family of the mother or wife. As is usual in polygynic houses, the husband must treat all his wives with strict impartiality. Companionship between him and any one of them is therefore not highly developed, unless a man has only one wife, in which case the latter loses much of her independence.

Among other cults the *vyali* of the women, the *vuwhera* of the boys (chiefly consisting of masked dances), and the *gomana* for men are prominent. All are connected with the ritual of drums, but this is specially the case with the *gomana*, which celebrates the coming of the ancestral spirits when a harvest offering has been made in the families of royal relatives, at the installation of a District head, or the death of close relatives of the queen. The songs are also employed when women dance for the rain and the type of instrument, by which the "ancestors" whistle their messages and chants, is also used by the Bird, the ruling spirit of the *vyali*.

The last *gomana* was held in 1892, just before the accession of the present queen—and perhaps her rain-making powers has made the revival of the cult largely unnecessary. The *vyali* is of such importance that, during the year that it lasts, everything else is completely overshadowed; it is not only an initiatory rite, but a fertility and rain cult.

In the north, whence the Lovedu ruling class came, the kings reigned only for short periods. They were not allowed to become old or decrepit "lest the kingdom suffer" and were therefore killed or committed suicide. But during the last one hundred and forty years there have been only three rulers, all queens; and Mujaji III, who has already been on the throne more than forty-three years, is still physically strong and is said never to have had a day's illness. Tradition here decrees that the queen shall have no physical defect and must poison herself at the end of the fourth *vudiga* initiation of her reign. She is deified by her ritual suicide.

Her death "heals" or "dries up" the soil in the double sense of "defiling it" (as twins do) and "scorching it" (as the sun does). Consequently after her demise come famines, heavy mortality among cattle and people, and the flight of many from the country. When Mujaji II committed suicide in 1894 there followed three years of unprecedented drought and pests, during which, according to contemporary European observers, practically all the cattle and a third of the population died. After the death of King Mugodo (*c.* 1800) there was a great famine. The only other famine vividly recorded by tradition was during the reign of a chief, who, being a usurper, was unable to make rain.

Power and authority derive from the queen's divine appointment, her exclusive secret of rain-making, and her position in the social web. She is neither a military nor a political leader, but is assisted by confidential advisers—councillors, who always reside in the capital and are generally her relatives; the most influential of these is usually her mother's brother.

The chief things feared by the people are disease and death, dissension, drought, and the disruptive danger of European intervention. The authors discuss, with much good sense, the last named, which is a grave source of anxiety to all friends of the tribe, and it is to be hoped that these relations will be settled amicably. As the Lovedu say, "Wisdom comes from the scar" (of experience) and "quarrels have no hiding place."

Some subjects of interest to the anthropologist such as birth and death ceremonial, arts and crafts, village organization, kinship terminology, etc., are omitted in this work and will be covered in later publications, but the main aspects of native culture and life in this microcosm of Negro society, such as exists from the Cape of Good Hope to the Gambia, are here discussed with very great insight, moderation, and accuracy, while the many excellent photographs really illustrate the text. Throughout, Lovedu words have been written in the script of the International Institute, though with some modifications: a practice becoming more common for anthropological studies.

It is impossible in this review to give an adequate idea of the value of the volume and of its scope, but there is probably no work which penetrates the Negro mind more deeply or gives such a fair, unbiased and, I feel sure, true view of an African tribe. The need of such books is more urgent in South Africa than anywhere in that continent, since nowhere else is contact so close and independence between the two races, Negro and European, of such vital importance. Here, if anywhere, knowledge of the black man's thought and aspirations is essential if the development of South Africa is to proceed on good lines and real harmony between the two races is to be secured. This cannot be obtained without such studies as that contained in this book, and it must be earnestly hoped that the authors will be encouraged to devote their time and efforts to further similar investigations.

P. AMAURY TALBOT.

REVIEWS

EUROPE

POLAND AND THE BALTIC. By H. Bagínski. *Edinburgh: Oliver and Boyd*, 1942. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* xx+212 *pages; maps and diagrams.* 15*s*

POLAND'S FREEDOM OF THE SEA. By H. Bagínski. *Kirkcaldy: Allen Lithograph Co.*, 1942. $9 \times 5\frac{1}{2}$ *inches;* x+138 *pages; illustrations and maps.* 12*s*

Colonel Bagínski has written two books on the question of Poland's access to the sea, about which a mass of literature has already appeared in many languages. The contents of the two books are very alike, but the first is distinguished by a good deal of geographical description, and the second by detailed comment on the period between the two world wars and on Poland's part in the present struggle. Both are written in that bitterness of spirit which must indeed colour every Polish view of territorial problems in Central Europe.

On two themes recurrent in Colonel Bagínski's work there will be general agreement. In the first place, Poland must have access to the sea. That every state needs a coast-line in order to be safe and prosperous is, of course, open to query. Switzerland, for example, has thriven for generations in land-locked territories. But it would be impossible to expect Poland after this war to conduct sea-borne trade through German territory and ports. Moreover, more generous provision than that of the ill-fated Corridor seems essential even at the expense of shifting long-established German populations, although few people would accept Colonel Bagínski's opinion of Poland's right to the Lower Oder lands and the port of Stettin. In the second place, all the Baltic states will require strict limitation of German influence in the Kiel Canal and Kattegat exits. A free use of the Baltic coast is of little value without the guarantee of safe passage to and from the North Sea.

To the reader with a fair knowledge of Polish history and geography, there are in these books some interesting facts, but anyone tackling Polish problems through them for the first time will find the subject-matter confused and ill-arranged. There is little discrimination between the main points and the details.

In 'Poland and the Baltic' the plans of some of the Baltic ports are new and interesting, although they suffer at times from inadequate legends and explanations. That of Memel for example is excellent, but that of Stettin is largely unintelligible for lack of lucid accompanying comment. Both books are plentifully illustrated with photographs, some of which are interesting, while others seem rather irrelevant. H. G. S.

ASIA

RESEARCH ON EARLY MAN IN BURMA. By H. de Terra and H. L. Movius. *Transactions of the American Philosophical Society*. (Philadelphia.) New Series, Vol. 32, part III, 1943.

This report of the American South-east Asiatic Expedition for Early Man, which made a tour in Burma in the cold weather of 1937–38 and continued on to Java, is divided into several parts. The first is a long account of the Pleistocene of Burma by de Terra, the second on the Stone Age of Burma by Movius, the third on Pleistocene vertebrates collected by the expedition in Burma by E. H. Colbert, the fourth on Fresh-water shells from caves in the Shan States by J. Bequaert, and the fifth on the Pleistocene geology of Java by de Terra.

In the first part reference is made to the remarkable erosive power of the master stream of Burma, the Irrawaddy, and it is no surprise to find a succession of five well-marked river terraces of Pleistocene and post-Pleistocene age. These terraces line both sides of the Irrawaddy and frequently rest on the sands of the well-known Irrawaddian. This great series of fluviatile sands is usually referred to as Mio-Pliocene in age but the Upper Irrawaddian has bands with mammalian remains. Movius now confirms the correlation made by the reviewer in 1922 between the Upper Irrawaddian and the Upper Siwalik—both Lower Pleistocene. The new fossils collected by the expedition and now described are all, unfortunately, derived—the important fossiliferous bed in the Irrawaddian is best seen at the base of the river cliff at Yenangyaung and would not have been exposed at the time of the expedition's visit—so that the fossils described are not contemporary with the implements. The latter are for the most part of the general type of the Chelleo-Acheulian of western Europe, but hand-axes are absent so that the culture has been given the new name of Anyathian. Full credit is given to Dr. T. O. Morris, geologist of the Indo-Burma Petroleum Company, for his pioneer discoveries and researches on these implements (see *Journal of the Burma Research Society*, 1932–37) which are regarded as Middle and Upper Pleistocene and are associated with Terraces 1–4.

An incredible amount of confusion has been caused in India and Burma by careless collecting: localities ought to be recorded with the utmost precision or much of the value of the work will be lost to future workers, and research has suffered from "too much writing and too little field work." It has taken half a century to clear up the confusion caused by Noetling's assigning artefacts from a terrace to a fossiliferous horizon at the foot of the cliffs 100 feet below, yet the crude recording of localities by the expedition suggests that the same error has been repeated. This is one of the few blemishes in a work of utmost scientific importance which, for the first time, put the Pleistocene geology of Burma on a firm foundation.

L. D. S.

NOTES ON THE CROOKED-BOW AND CROOKED-STERN JUNKS of Szechwan. By G. R. O. Worcester. (China: Maritime Customs III, Misc. Ser., 52.) *Shanghai: Inspectorate Gen. of Customs*, 1941. 11×8½ *inches;* viii+82 *pages; illustrations and diagrams.* $12.50

Mr. Worcester is an authority on the craft of the Upper Yangtze who brings to his subject a wide technical knowledge of boat-building and seamanship. This monograph is devoted to the curious junks of two tributaries of the Upper Yangtze, the Yentsing Ho, on which is situated the great salt-producing centre of Tzeliutsing, and the Kungt'an Ho which, flowing out of Kweichow Province, reaches the Yangtze at Fowling (Fowchow). On the first river the junks have crooked bows, on the second crooked sterns.

The author explains in detail the method of construction and examines the reasons, alleged, traditional, or practical for the unusual features shown in these craft: he shows that they are, in spite of picturesque legends, severely practical and ingenious devices designed to solve the problems presented by rivers which no people but the Chinese would have attempted to navigate. This is, in fact, a valuable account of peculiar craft examined by an expert able to assess the function of each element in their design, and able to explain from observation how aptly it meets some particular requirement of this perilous navigation.

In a preliminary chapter the author gives an interesting description of the salt industry at Tzeliutsing—an industry which furnishes the main cargo of the crooked-bow and crooked-stern junks.

It is interesting to note that the author found only the axe and auger in use

among the carpenters of Fowling who build the crooked-stern junks. Even the saw was hardly used and the plane practically unknown. This is very strange when one considers that the Chinese carpenter of any remote village is continually employing these and the other ordinary tools of his trade. C. P. F.

AFRICA

SOUTH AFRICAN SCENERY: a textbook of geomorphology. By L. C. KING. *Edinburgh: Oliver and Boyd*, 1942. 9×5½ *inches;* xxiv+340 *pages; illustrations, maps, and diagrams.* 25*s*

Dr. L. C. King's book, 'South African Scenery,' is based on the best of advice: Go and see. He has travelled widely in the southern half of Africa since his arrival there from New Zealand some years ago: his enterprising and strenuous expeditions have also led him into British East Africa, Portuguese Africa, and the Belgian Congo. He has used his own training, his eyes, and his camera to great advantage. The book is in this sense a record of purposeful travel. These journeys, and excursions with field classes, have enabled him to set out an orderly physiographical subdivision of South and southern Africa which, reminiscent of Fenneman's work in North America, is of service to a wider public than the university students for whom, no doubt, it is primarily intended.

The book is clear, logical, and above all will incite students of any country and any age to go into the field and use their eyes. The material is intended to be neither exhaustive nor highly technical. In fact, the book has the merit of being what it claims, a scientific account of the scenery of the country; it is an encyclopedia neither of the author's knowledge nor of the subject. It brings the country to the lecture-room and in some degree avoids the stultifying process of imposing theory upon the landscape. As the book is written for students, perhaps inevitably it reflects the "cycle concept." Dr. King seems to move in the ranks of the school which we attribute to W. M. Davis, but his presence among this host may be an act of faith rather than a satisfying deduction from his wide and hardly-won observations. It is to be hoped that, continuing his studies in the great and inspiring country where he has already made his mark, he will maintain a sturdy independence. University students can learn to appreciate physical geology without a cycle concept as its dominant theme.

Detailed criticism cannot be undertaken in the available space: there are some parts of the book which in the reviewer's opinion are not as good as the rest and on which divergence of views is appreciable, but unquestionably this is a good and refreshing text-book, to be recommended to a wide public in both hemispheres.

Production (in this country) is excellent: there are more than three hundred illustrations, text figures being good, clear, and convincing, the photographs varied, informative, and nearly all of them very good. Dr. King has had generous assistance from official, academic, and economic authorities in South Africa and elsewhere in his choice of material, and he has chosen well. His own illustrations are outstandingly good. In a second edition readers unfamiliar with South Africa and adjoining territories would no doubt welcome a good general map (preferably a folding-map at the end of the book), and a more comprehensive list of references would be an undoubted improvement. A pre-war standard of publication has been attained in every particular, a most remarkable achievement in the third year of the war: in these circumstances the price seems to be very moderate.

The reviewer cannot recall any similar book on South Africa, and in his opinion it deserves to be widely known. K. S.

HISTORICAL GEOGRAPHY

THE BRITISH EMPIRE; its structure and spirit. By E. A. WALKER. (Under auspices of the R. Inst. of Internat. Affairs.) *Oxford: University Press*, 1943. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* 250 *pages; map.* 12*s* 6*d*

To deal with the structure and spirit of the British Empire in their historical setting in a short book is a difficult task. Professor Walker has simplified it by giving most of his pages to events after 1914, and by fixing his attention upon the main developments and upon the similarities and contrasts presented by the various constituent parts. His book forms an enlightening introduction to the present structure and function of the Empire, the lines upon which future advance should proceed, and the contribution it can make to future international relations. It is vigorously written and balanced in judgment, without over-simplifying the issues or concealing a definite point of view; it asks that the Empire's "good deeds should be remembered rather than its ill."

Inevitably perhaps in view of recent events he is most critical of the management of imperial affairs after 1930; particularly the failure to produce a policy in place of the abandoned League covenant and to look to the efficiency of the armed forces. He dislikes the departure from a more liberal policy which found expression in the Ottawa agreements, largely on account of the handle they afforded to hostile forces. If however the Empire did eventually abandon the principle of free exchange, it was among the first to recognize the mistake and to mitigate in part the disadvantages of a closed economy. This realization of the interdependence of the modern world has spread from the economic to the political sphere, and upon this text the author concludes. He sees the Anglo-Saxon contribution to the future arising from their long history as "political amalgamators."

The book takes account of all recent research into its subject-matter, and is illuminated by the author's special knowledge and experience. One small slip has been noticed, the statement that the Inperial Institute was founded in memory of the Prince Consort.

DEATH OF SIR AUREL STEIN, K.C.I.E., F.B.A.

On the morning of October 27 *The Times* printed a Reuter message from Kabul announcing the death of Sir Aurel Stein, and a telegram from Mr. Cornelius van H. Engert to Sir Edward Maclagan, which we are allowed to quote, read: "Deeply regret to inform you that Sir Aurel Stein passed away peacefully in my house this afternoon (October 26) having received every possible care at the hands of the British Legation doctor. One of his last remarks was 'I have had a wonderful life and it could not be concluded more happily than in Afghanistan which I had wanted to visit for sixty years.'" He was buried in the Christian Cemetery at Kabul on October 29.

On the morning of October 28 Mr. C. E. A. W. Oldham received an Air-graph from Sir Aurel (dated October 6 from Srinagar) and sends the following extract: "I know of your interest in Hinglaj, and hope you will read something about it in the first portion of my Las Bela Preliminary Note. . . . More about it I wrote in a paper which I have sent for the *G.J.* . . . Alexander's route into and through Gedrosia has been fully discussed in it as you had wished for. . . . I am just about to start for a preliminary visit to Kabul, in the hope of securing the chance desired since my boyhood for work in Ariana Antiqua. Approval from New Delhi has been received for this fresh attempt, initiated by a Harvard friend, now U.S. Minister at Kabul. How it will succeed the gods of Kapisa

might know. A second report on the Hakra is nearly completed. . . ." Hinglaj is an ancient site of pilgrimage in the Las Bela State, Baluchistan.

A letter received at the Society in August had told of two journeys made this year, one in Bahawalpur to complete his survey of the Hakra (the "lost Sarasvati" river), and a second from the Arabian Sea coast up the hill ranges to the north-east extremity of Makran. Sir Aurel then spoke of his plan for the autumn, to complete the exploration of the Kohistan east of the Indus, which tribal unrest had made impossible last year. Whether his preliminary journey to Kabul was an interlude before Kohistan, or a substitute for it, is not at present clear. But his friends will be glad to know that his eighty-first year was so active and fruitful, and that he was able to travel almost to the last day of his life.

OBITUARY

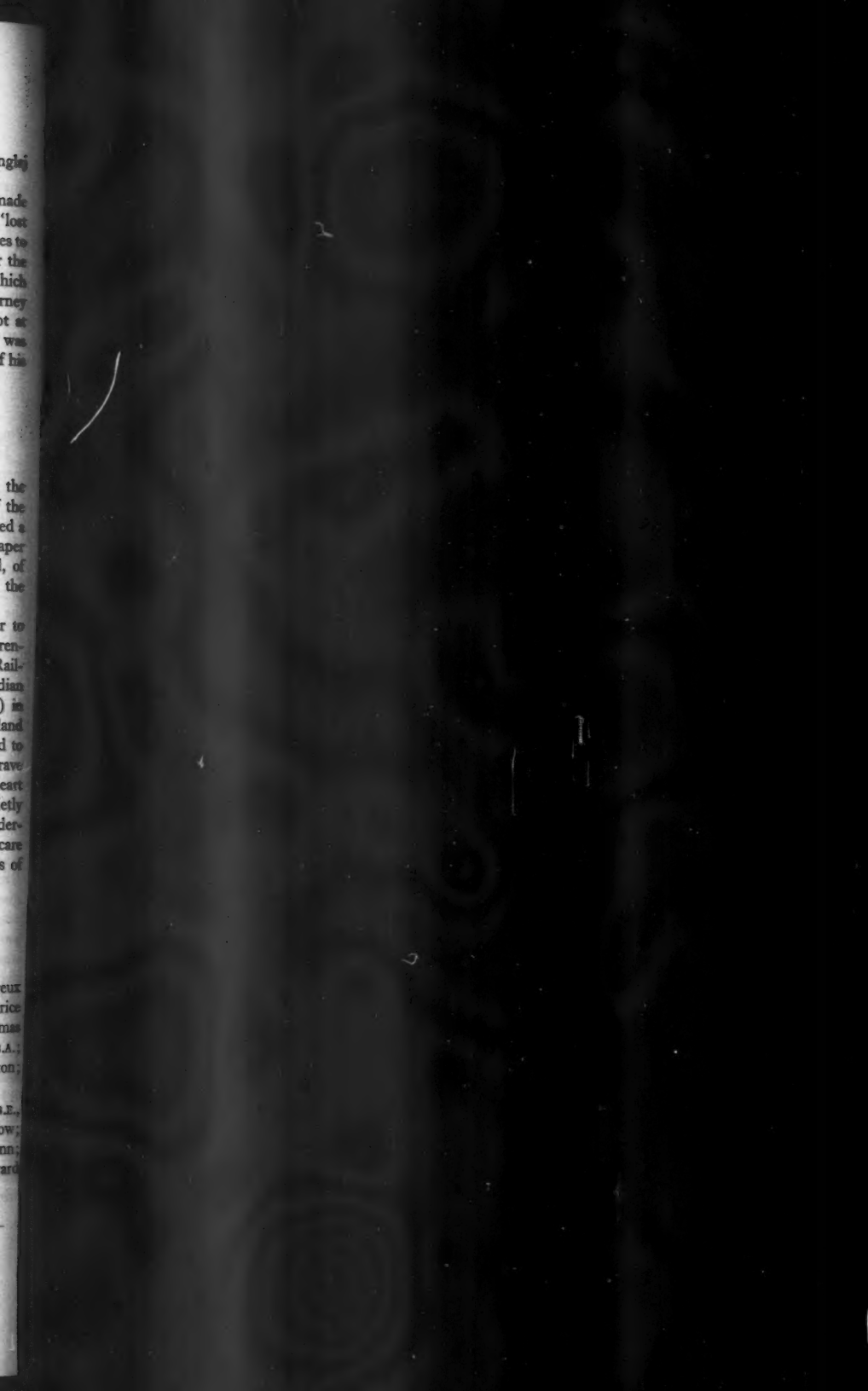
H. O'B. HAYWARD

News of the death in Poona on active service of Henry Hayward reached the Society in the summer. He will be remembered for his reconnaissance of the Safartok river, West Greenland, in 1935, in which year he organized and led a small expedition of the Oxford University Exploration Club. He read a paper before the Society on his return and a further expedition was organized, of which he was Home Agent: to his great regret he could not accompany the party.

In what seemed a remarkably short time he went up from Winchester to Brasenose to read engineering, joined Metropolitan-Vickers to serve an apprenticeship, and held a post in Vancouver with the British Columbia Electric Railway Company. While in Vancouver he was attached to the Royal Canadian Artillery, having taken a Territorial Army Commission (Royal Artillery) in 1936. On the outbreak of war he returned to rejoin his regiment in England and was promoted Temporary Captain soon after. In 1941 he was posted to the Royal Bucks Yeomanry (R.A.) and later went to India. His death is a grave loss to his friends and to those who may restart Arctic exploration. His heart was in West Greenland, whither he hoped to return. He was thorough, quietly determined, cheerful; he possessed great personal charm, and powers of leadership. His enthusiasm was tempered by unselfishness, common sense, and care for essential detail. He earned the respect and affection of his seniors as of his contemporaries.

ELECTIONS

The following have been elected Fellows of the Society

On 20 July 1943: Leslie Charles Thomas Bulport; Captain Patrick Devereux Coates; Lieut. Frederic Bowes d'Enis, R.N.V.R.; The Hon. Mrs. Maurice Glyn; John Ronald Hinchley, B.SC.; Kenneth Seagrave McKay, B.A.; Thomas Harley Marshall, M.A.; William Percy Meikle; John McKee Miller, B.A.; Shankar Pratap; Miss Gwladys Mary Price; Rev. John William Shenton; James Leslie Williams

On 19 August 1943: Miss N. M. Baker, B.A.; Dorian A. Blair, A.M.INST.B.E., F.I.L.; Alfred C. Bossom, M.P.; R. H. E. Stedman Clubb; Reginald Goodfellow; Mrs. Tranchell Hayes; Captain W. R. Jones, M.A.; Captain St. J. L. Mann; Captain John T. Murray, PH.D., M.SC., M.A., F.R.S.A., R.E.; Albert Edward Fowler Thomas; Captain Ronald Arthur Tinker